CRANFIELD UNIVERSITY

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BANKING SECTOR DEPTH & LONG-TERM ECONOMIC GROWTH IN THE GCC STATES: RELATIONSHIP NATURE, SECTOR DEVELOPMENT STATUS & POLICY IMPLICATIONS

SCHOOL OF MANAGEMENT
International Executive Doctorate

DBA
Academic Year: 2012 - 2016

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This thesis is submitted in partial fulfilment of the requirements for the degree of Doctor of Business Administration

ABSTRACT

The thesis investigates the nature of the relationship between the banking sector depth and long-term economic growth in the Gulf Cooperation Council (GCC) States, assesses the banking sector development status in each of the States, and underlines the policy implications in the light of the banking-growth nexus and the banking development benchmarking models' findings for the region by undertaking three projects.

The thesis examines the nature of the relationship between banking sector depth and long-term economic growth in the NRBC—as a proxy for the GCC States— vis-à-vis the rest of the world countries. For the empirical investigation, a dynamic panel data approach, i.e. Generalised Method of Moments (GMM), is adopted over the period 1961 to 2013. By utilising mixed effects and System GMM frameworks, the research identifies the countries with the strongest banking-growth relationships and establishes the banking sector development determinants in those countries. Employing a novel benchmarking process, the thesis assesses the status of the banking sector development in each of the GCC member countries and simulates the change in the banking sector depth across the Gulf region over a period of ten years to highlight the potential policy implications for the sector development.

The findings of the thesis suggest that the relationship between banking sector depth and long-term economic growth in the NRBC is non-linear, where the relationship between the banking sector depth and economic growth turns from positive to negative beyond certain levels of sector depth. In comparison to other countries, the results indicate that the banking-growth nexus in the NRBC exhibits a smaller total effect magnitude as well as a shorter time between the change in the sector depth and its effect on economic growth. The benchmarking of the banking sectors in the GCC region suggests that in five of the six member countries the banking sectors are underdeveloped. The simulation results predict that the banking sectors will develop further in half of the countries in the region, given their current levels of banking sector

development determinants, while two countries require reforms in terms of undertaking regulations and policies to avoid seeing their sector development levels deteriorate.

The thesis contributes to theory by confirming findings in the literature and expanding the body of knowledge through novel findings. This research also contributes to policy by demonstrating the significance of the banking sector development for long-term economic growth in the NRBC, providing policymakers in the Gulf States with the status of their banking sectors, and underlining the banking sector depth determinants that ought to be considered when setting regulations and policies that are aimed at developing the banking sector further.

Keywords:
Finance-Growth Nexus, Banking Sector Development Benchmarking, Banking Depth Determinants, Natural Resource-Based Countries, Generalised Method of Moments

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LIST OF EQUATIONS

LIST OF ABBREVIATIONS

2SLS	Two-Stages Least Squares
ADF	Augmented Dickey-Fuller
ANOVA	Analysis of Variance
ARDL	Autoregressive Distributed Lag
BLUPs	Best Linear Unbiased Predictions
CPI	Consumer Price Index
DEA	Data Envelopment Analysis
DFA	Distribution-Free Approach
DOLS	Dynamic Ordinary Least Squares
ECM	Error Correction Model
EGLS	Pooled Estimated Generalised Least Squares
EPS	Earnings per Share
EU	European Union
FDI	Foreign Direct Investment
FGDP	Financial Sector GDP
FMOLS	Fully Modified Ordinary Least Squares
G20	Group of Twenty
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GLS	Generalised Least Square
GMM	Generalised Method of Moments
GNI	Gross National Income
GNP	Gross National Product
HHI	Herfindahl–Hirschman Index
IC	Intellectual Capital
ISIC	International Standard Industrial Classification
IV	Instrumental Variable
LAC	Latin America and the Caribbean
LICs	Low-Income Countries
LRSM	Long-Run Structural Modelling
MENA	Middle East and North Africa
MGDP	Manufacturing GDP
MINQUE	Minimum Norm Quadratic Unbiased Estimation
NRBC	Natural Resource-Based Countries
NYMEX	New York Mercantile Exchange
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
RMP	Relative Market Power
ROA	Return on Assets
ROAA	Return on Average Assets
ROAE	Return on Average Equity
ROE	Return on Equity

SCP	Structure Conduct Performance
SFA	Stochastic Frontier Analysis
SLR	Systematic Literature Review
SSA	Sub-Saharan Africa
SUR	Seemingly Unrelated Regression
TFP	Manufacturing Total Factor Productivity
TQ	Tobin's Q
UAE	United Arab Emirates
VAIC	Value Added Intellectual Coefficient
VAR	Vector Autoregressive model
VECM	Vector Error Correction Model
WTO	World Trade Organization

Linking Document

1 Introduction

Prior to 2008, many economists contended that the financial sector development promotes long-term economic growth.[1] It is argued that financial intermediaries ameliorate market frictions—related to information asymmetry and transaction costs among others—changing the incentives and constraints facing economic agents. This subsequently affects the saving rates, investments decisions, technological innovation, and thus long-term economic growth (Levine, 2005). In the aftermath of the Global Financial Crisis 2008-09, new evidence suggests that financial intermediaries and markets are to some extent responsible for the crisis that had devastating effects on economies across the world. In particular, recent research findings in this area indicate that the finance-growth nexus is non-linear, thus implying that the development of the financial sector stimulates economic growth only up to certain levels beyond which the relationship turns from positive to negative.

Since the discovery of crude oil in the Gulf in the early 1930s, the GCC States have become increasingly dependent on the hydrocarbon sector for their exports, government revenues, and economic growth. This dependency exposes the countries across the region to fluctuations in their current accounts, fiscal budget balances, and income levels due to the price volatility of the international commodity markets. Other challenges facing the region as a result of its high reliance on crude oil and natural gas include the lack of growth in other economic sectors and the unsustainability of the current economic structure over the long-term as natural resources are finite.

Recognising the challenges associated with the high dependency on the hydrocarbon sector, policymakers in all the Gulf States have put the goal of economic diversification away from industries related to crude oil and natural gas at the forefront of their strategies and policy agenda. The GCC's governments strive to establish and develop alternative economic sectors that can generate long-term economic growth, thus

[1] Financial sector development comprises the development of the banking sector as well as the financial markets. Each has four dimensions: depth, access, efficiency and stability (Čihák et al., 2012). In this thesis, the focus is on banking sector depth so the term financial sector development is used interchangeably with banking sector development.

maintaining the current levels of real income and living standards for the people of the region.

In this context, the banking sector is one of the sectors with the potential to meet the economic diversification and growth objectives. The financial sector is the third largest contributor to GDP—following the hydrocarbon and public sectors—in the GCC region. The banking industry, however, remains underdeveloped relative to its peers in the high-income country group to which the GCC States belong. Developing the banking sector further has the potential to stimulate economic growth directly via its own growth, and indirectly through facilitating the establishment and development of economic sectors that depend on long-term debt for their growth.

In the literature, only a few studies examine the finance-growth link in the context of the Gulf States. Generally speaking, the findings of the studies are inconclusive in relation to the significance of the banking sector for economic growth and fail to address the magnitude of the relationship in the region. Investigating the nature of the relationship in the context of the GCC States thus contributes both to the development of the literature and to policy.

At a personal level, my interest in the research topic, the relevance to my professional development, and the policy implications of such a novel research, have provided the impetus for me to undertake the doctorate qualification.

As a professional banker as well as a trained economist based in the Gulf region, understanding the importance of the financial sector development for the GCC's economy is of great interest. The GCC is a political and economic union that comprises Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE, and was established 1981. The countries share *inter alia* common language, culture, history and economic structure and aspire to develop their economies to generate sustainable long-term real income growth for their people. The banking sectors in the region undergo a similar development cycle with most of the countries accelerating the sector reforms in the first decade of the new millennium (Srairi, 2011b). As a citizen of one of the member

countries, I am interested in exploring the banking-growth nexus in the context of the GCC region. In the literature, some scholars contend that the financial sector is an over-stressed determinant of long-term economic growth (Lucas, 1988). Furthermore, studies focusing on the natural resource-based economies suggest that economic growth is dominated by the industries related to the natural resource, which crowds out the development of other economic sectors (Gylfason, 2004). Assessing the nature of the relationship between the banking sector development and economic growth in the region allows us to establish the significance of this sector for the real economy. A positive banking-growth relationship, for instance, suggests that developing the sector further would have favourable implications for the economy beyond the improved access to finance, and higher sector depth, efficiency and stability.

Identifying the status of the financial sector development is also essential for professionals who are aiming to take their sectors to the next level. Benchmarking the banking sector development in the Gulf States can provide industry leaders with evidence about the levels of the sector development among different dimensions, highlighting the areas for potential development. For example, if the level of client access to the banking sector is found to be low relative to the benchmark, the banking professionals would make an assessment and take steps that provide their clients with more channels through which to obtain their financial services. In addition, determining the maturity level of the banking industry enables practitioners to project, among others, future trends in competition, profitability, and stability in their industry.

Finally, the decision to undertake the doctorate reflects a personal interest in conducting an extended research at a policy level. At the postgraduate level, I hold an MSc qualification in Development Economics which not only provided me with the skills required to conduct research but also demonstrated to me the importance of economic policies for the growth and development of nations. Undertaking research that has policy implications can have an impact beyond the theoretical contribution, by influencing individuals' living standards and quality of life.

The objective of this document is to state the overarching thesis questions and show how the different research projects' findings address those questions while highlighting the research contribution to theory and practice, as well as the research limitations. The document is structured as follows. The next section provides an overview of the thesis' overarching objectives and questions, research process, as well as the method and findings associated with the three individual projects. Section three discusses the research findings in relation to the literature and underlines their significance. Then thesis contributions to theory are summarised in section four before the policy implications are considered in section five. The last section of this document reflects on the study limitations and proposes areas for further research.

2 Research Process, Methods & Findings

2.1 Overarching Research Objectives & Questions

In the light of the research context discussed in the earlier section, the thesis sets three general research objectives. The first relates to identifying the nature of the relationship between the banking sector development and that long-term economic growth in the Gulf region. The focus on the long-term relationship in this study—as well as in the broader literature—reflects the importance of understanding the factors influencing the economic growth trend and subsequently the living standards of people over time.[2] The aim is to confirm whether the banking sector development stimulates economic growth in the natural resource-based GCC States, as is the case in other countries that are not dependent on natural resources. The first research objective also purports to measure the magnitude of the banking-growth relationship should this exist.

The second research objective is to evaluate the level of the banking sector development in the region. The initial comparison of the sector development ratios for the GCC countries with those of their peers in the high-income countries suggests that the banking industry in the region is relatively underdeveloped. A more in-depth evaluation

[2] A number of researchers examine the short-term relationship between financial development and economic growth with the aim of assessing the effect of the sector development on the volatility of economic growth (see for instance Beck et al., 2014; Loayza & Ranciere, 2006)

of the status of the banking sector development is thus required to achieve conclusive findings.

The final research objective pertains to the policy implications for the Gulf States in the light of their banking-growth relationship and status of the banking sector development. The intention is to highlight to policymakers certain aspects that can influence the level of sector development and, potentially, long-term economic growth. Overall, understanding the nature of the relationship and the status of the sector development in the context of the Gulf countries not only expands the current literature but also provides policymakers concerned with the banking sector development, economic diversification, and/or long-term economic growth, with crucial information to decide on whether more resources ought to be devoted to the sector development or not.

In view of the general research framework, three overarching research questions are set in this thesis:

Q1. What is the nature of the relationship between the banking sector development and long-term economic growth in the GCC region?

Q2. What is the status of the banking sector development in the GCC States?

Q3. What are the policy implications, given the banking-growth nexus and the status of the banking sector development in the GCC region?

The questions, which developed throughout the course of the research, provided the general direction for the thesis. In particular, the research process and the findings associated with each stage of the research dictated the final course of the thesis.

2.2 Summary of the Research Process

The doctorate research process started with a number of preliminary studies aimed at developing the research topic and setting the doctorate research plan. Thereafter, a scoping study was undertaken to identify and explain the research problem, position the research in relation to existing theory, and set research questions for the first project of the doctorate. Three projects that constitute the main body of this thesis follow the scoping study. Each research project addresses certain problems and, based on its findings, offers questions for further research.

The first project in this thesis reviews the broad literature focused on the GCC region's banking sector as well as the banking-growth nexus in the NRBC. The intention is to explore all the literature related to the research topic and synthesise the findings of other scholars prior to investigating the topic empirically. The second project of the thesis addresses the first overarching research question by assessing the relationship between banking sector development and long-term economic growth in the NRBC as a proxy for the GCC States. Based on the findings of the second project, which demonstrate the significance of the banking sector depth for economic growth, the third project answers the second and third overarching research questions by evaluating the status of the banking sectors in the GCC countries via benchmarking, and highlighting the policy implications for the region using simulation. The next subsection provides an overview of the scoping study as well as a summary of the methods and key findings associated with the three projects.

2.3 Scoping Study & Research Projects: Selected Methods & Key Findings

2.3.1 Scoping Study

Taking into account the financial development and economic growth literature, the scoping study considers the banking sector in the GCC countries in relation to economic growth and stability. The paper is intended to hone the overarching research questions and propose areas for further research for the literature review in Project I. The study provides a background to the economic structure and financial development in the Gulf States, discusses the finance-growth nexus literature, including its recent findings and papers considering the GCC countries, highlights the importance of economic diversification for the region, and proposes questions for further research. The study is summarised in the following subsections.

2.3.1.1 Economic Structure & Financial Development in the Gulf States

The GCC is a political and economic union that comprises Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the UAE, and was established 1981. The latest figures from the region show that the population stands at 50.1 million while the GDP exceeds USD 1.63 trillion. The region's economy is dominated by the hydrocarbon industry; it is estimated

that the GCC holds 40% of the worlds proven oil reserves and 23% of the proven natural gas reserves (Iradian, 2009). This is while the hydrocarbon exports as a percentage of GDP ranged from 22.5% to 53.7% in 2014 (Reusche & Villareal, 2016). All the Member States except Kuwait have now followed a fixed exchange rate policy for more than 25 years.[3]

There are several characteristics that distinguish the GCC countries. First is the high dependency on the hydrocarbon sector in the region where the sector accounts for 49% of its GDP and its receipts amount to 87% of the total government revenues (QNB, 2012). The second feature of the Gulf economies is the large welfare state where crude oil and natural gas revenues are used to distribute economic rents to the public in the form of direct payouts, free public services, subsidies, and employment in the public sector. Another noticeable feature of the GCC countries is the dominance of family businesses in the private sector. According to Cambieri (2013), 98% of companies operating in the region are family controlled and family businesses account for 75% of the private sector economy. Finally, the demographic structure of the GCC is also unique compared to other regions. The total population size in the six States is small (less than 1% of the world population) with high levels of international immigrants.

Over the first decade of the millennium, the GCC region experienced considerable acceleration in economic activities following the sharp increase in crude oil and natural gas prices. This period also exhibited significant developments in the region's capital markets and banking sector. Despite the strong growth in the banking industry during this period, the banking sector remains underdeveloped relative to its peers. Compared to the other countries in the top quartile group, in terms of per capita income, the average bank private credit to GDP for the region was at 50% in 2011 while it stood at 104% for the other top quartile countries.

[3] Bahrain adopted a fixed exchange rate in 1980, Oman in 1973, Qatar in 1980, Saudi Arabia in 1986 and the UAE in 1978, while the Kuwaiti Dinar is pegged to a basket of currencies that is dominated by the US Dollar.

2.3.1.2 Literature Review

The relationship between the development of the banking sector and long-term economic growth has been debated among scholars for years. Some economists suggest that the financial development merely follows the economic growth (Robinson, 1979) and its role in stimulating economic growth is over-stressed (Lucas, 1988). This is while other scholars contend that the development of the financial sector encourages long-term economic growth (Bagehot, 2009; Schumpeter, 2012, among others). Levine (2005) reviews the literature and summarises the role of the financial sector as producing information *ex ante* on potential investments and allocating capital, monitoring investments and enhancing corporate governance of the borrowing firms, facilitating trading, diversification and risk management, mobilising and pooling savings, and facilitating the exchange of goods and services.

Over the last two decades, more papers investigating the relationship between financial development and economic growth using empirical research methods as datasets have become available. The findings generally provide evidence that support the view that financial development and the development of the banking sector in particular promote long-term economic growth (see for instance Beck et al., 2000; Levine et al., 2000). Following the Global Financial Crisis of 2008-2009, a third view emerged, suggesting that the development of the banking sector can be harmful for economic growth. It is argued that beyond a certain level of banking sector development the relationship between the sector and economic growth turns negative (Arcand et al., 2012). Economists contend that the overdevelopment of the banking sector is associated with financial instability and economic crises (De la Torre et al., 2011).

In the literature there are only a few papers that consider the finance-growth relationship in the GCC area (Chuah & Thai, 2004; Hamdi et al., 2012) or in the context of the natural resource-based economies (Beck, 2011). The findings of the latter show that the natural resource-based economies have less developed banking sectors while the oil-exporting countries benefit less from the development of the banking sector.

2.3.1.3 Rationale for Economic Diversification

Today one of the key economic objectives of the development plans and strategies of the GCC States is to diversify the economies away from the hydrocarbon sector. The aim is to attain a sustainable long-term economic growth and higher living standards for the people of the region. The issue of economic diversification has been placed at the forefront of economic policy in the region due to four factors: hydrocarbon resources are finite; the demand and the price for those resources fluctuate considerably over time; their revenues have crowded out other economic activities; and those resources represent the only source of wealth for the region (Hvidt, 2013). Thus the development of other economic sectors is desired across the region. The underdevelopment of the banking sector in the region positions the banking sector to play a greater role in the diversification and economic growth of the region.

2.3.1.4 Areas for Further Research

In the light of the economic structure of the Gulf region and the development in the finance-growth nexus literature, the paper proposes the following questions for further research:

Q1. What is the nature of the relationship between the banking sector development and long-term economic growth in the Gulf region?

Q2. What is the status of the banking sector development in the GCC States relative to their peers in countries with similar levels of per capita income?

Q3. The initial data analysis suggests that the sector is underdeveloped. What are the factors that limit the development of the banking sector in the region?

Q4. Are there any impediments that prevent the development of the banking sector from promoting long-term economic growth to the same extent as its counterparts in other countries with similar levels of per capita income?

Q5. What is the nature of the relationship between banking sector development and economic stability in the GCC region?

The scoping study also proposes undertaking an SLR in Project I and empirical studies in Projects II and III of the doctoral thesis.

2.3.2 Project I: A Systematic Literature Review

The first project reviews the literature that considers the relationship between the banking sector development and long-term economic growth in the NRBC in general and the GCC member countries in particular. The research also examines the studies related to the banking sector in the GCC countries and region. The intention of the review is to address the review questions, highlight the current areas of research, and suggest topics for further research.

2.3.2.1 Research Method & Design

The reviews are conducted using the SLR approach. In comparison, the SLR "differ(s) from the traditional narrative reviews by adopting a replicable, scientific and transparent process, in other words a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit of the reviewers decisions, procedures and conclusions" (Cook et al., 1997, in Tranfield et al., 2003, p. 209). The SLR in this research addresses two review questions. The first is *"What is the nature of the relationship between banking sector development and long-term economic growth in the context of the resource-based economies in general and the GCC in particular?"* The second is *"What are the characteristics of the banking sector in the GCC?"*

According to Briner et al. (2009) a SLR rigorously addresses clearly set questions, involves a range of stakeholders in the process of setting the review questions and the distribution of the review results, entails searching published and unpublished literature extensively, explicitly sets the studies' inclusion criteria *ex ante*, reports the findings of the reviewed studies in a brief, transparent and accessible format, and summarises the final review outcomes into a set of practical conclusions.

The SLR approach is selected for two reasons. First, the limited and scattered literature requires thorough and systematic searches of the databases to ensure that all relevant studies are located. Studies concerned with the banking sector in the GCC States are somewhat limited in number, dispersed throughout various academic journals, working papers and conference proceedings, and ill-positioned within the literature on the region, limiting the possibility of locating research papers via cross-referencing. The

second reason for selecting the SLR method for reviewing the literature is the diversity of the research in the banking sector literature. The approach provides standard data extraction and the synthesis processes enable the research to identify common research themes and synthesise the findings of the studies included in the review in order to answer the review question.

The systematic review is conducted in accordance with a protocol that sets the research objectives and questions, the composition of the review panel, the search strategy, the selection criteria, the quality appraisal of the selected studies, the data extraction process, and the data synthesis.

The review questions enable the researcher to identify the relevant search and selection criteria when reviewing the literature, and to ensure that the research investigates the specific questions and problems. The SLR panel, consisting of experts in the area of theory and methodology, directs the review process and resolves disputes over what is to be included or excluded from the research. The search strategy is required to specify the searching terms and strings and set a clear search process; this is while the selection criterion is applied to ensure that the study topic, the context, the publication type, the publication date, and the language of the studies are relevant and suitable. The quality appraisal that follows assesses the overall quality of the selected studies using a predetermined criterion limiting the review to studies with medium to high research standards. Subsequently, a data extraction process is implemented to obtain key information for each study before finally the data are synthesised to answer the review questions and identify areas for further research.

2.3.2.2 SLR Findings: Review Question I

In relation to the nature of the relationship between banking sector development and long-term economic growth in the context of the resource-based economies in general and the GCC in particular, the SLR demonstrates that the literature findings support the notion that the development of the banking sector promotes long-term economic growth. Out of the 33 studies, 23 report a positive relationship between financial development and economic growth whilst eight provide evidence of a negative

relationship. Research studies suggesting that no relationship exists between financial development and economic growth are limited to two.

A number of studies contend that, in the natural resource-based economies, the abundance of resources has a crowding out effect on financial development (Gylfason, 2004; Gylfason & Zoega, 2002; Hattendorff, 2013). This is supported by the findings that financial deepening is lower in the resource-based economies (Beck, 2011) and that oil-exporting countries derive less growth from the financial sector development (Barajas et al., 2013b). Others argue that the effect of natural resources' abundance on the finance-growth nexus depends on the level of political institutions' development (Bhattacharyya & Hodler, 2010). It is, however, suggested that a positive relationship between banking sector development and economic growth is only present when credit to the public sector is taken into account (Al-Zubi et al., 2006).

For some scholars, the negative link between financial development and economic growth is explained by the dominance of the public sector on the banking industry (Ben Naceur & Ghazouani, 2007) and the high levels of financial repression (Goaied & Sassi, 2011). However, for others it is a result of the dampening effect of the financial sector on investments in the oil-exporting countries (Nili & Rastad, 2007). In the case of individual countries, some authors argue that the negative relation reflects the ongoing financial sector transition and suggests that the relationship would turn to positive after a certain level of financial development (Al-Malkawi et al., 2012).

Unlike in the case of the finance-growth relationship, where 70% of the studies included in the review find a positive relationship, the findings of the studies with respect to the direction of causality are not dominated by a single result. From the 15 studies that investigated the direction of causality between the banking sector development and economic growth, 27% of the studies report that banking sector development promotes economic growth. The percentage of the studies indicating that the causal relationship runs from economic growth to the financial sector development is 7%, although the share of research papers finding a bidirectional relationship between the two variables is

33%. An equal percentage also reported mixed or no causal relationship between financial development and economic growth.

On the basis of the undertaken review, only two studies are found to look into the finance-growth relationship in all the GCC countries. In particular, Hamdi et al. (2012) explore the relationship for the region as a whole whilst Chuah and Thai (2004) look at each GCC member country individually. In both studies, the authors investigate the existence of a long-term relationship and the direction of causality between banking sector development and economic growth. The studies, however, overlook the extent to which one variable influences another. The authors fail to consider the size of the effect of change in the banking sector development on the long-term economic growth and vice versa.

2.3.2.3 SLR Findings: Review Question II

The SLR addressing the characteristics of the banking sectors in the GCC States reveals a number of features and trends in the sectors' efficiency, productivity, profitability and competition.

The research studies investigating the efficiency of the banking sector in the UAE indicate that the efficiency levels have changed over the last two decades (Al-Tamimi & Lootah, 2007; Aly & Kandil, 2006; Tai, 2012). In the case of Bahrain, bank efficiency improved between 1998 and 2000 (Hassan et al., 2004). Research studies examining the GCC region demonstrate that bank efficiency was constant between 2000 and 2004 (Ramanathan, 2007) but increased between 1999 and 2007 (Srairi, 2009a).

In 80% of the research conducted to explore the level of productivity in the GCC banking sectors, the findings suggest that productivity was constant or declined in the 1990s and the early 2000s (Al-Muharrami, 2007; Ariss et al., 2007; Ramanathan, 2007; Srairi, 2011b). The rate of growth in productivity increased rapidly in the region between 2003 and 2007 (Srairi, 2011a). Srairi (2011a) associates the growth in bank productivity with the financial liberalisation of the early 2000s.

In eight of the 13 studies considering the profitability and performance of the GCC's banks, the researchers investigate the determinants of bank profitability and performance. Excluding two studies that focus on the effect of the bank's board of directors and market orientation, 50% of the remaining studies that examine the bank profitability and performance determinants show that the former is positively associated with liquidity (Al-Hares et al., 2013; Al-Tamimi, 2010; Murthy, 2013) as well as return on assets (ROA) (Masood et al., 2009; Rettab et al., 2010; Srairi, 2009b). This is while 33% of the studies suggest that market concentration (Al-Tamimi, 2010; Srairi, 2009b) and bank efficiency (Poghosyan & Hesse, 2009; Rettab et al., 2010) are positive for bank profitability.

Evidence from research papers that examined the market concentration and competition in the banking sector indicate that the GCC banks operate under a monopolistic competition market environment (Al-Muharrami, 2009; Al-Muharrami et al., 2006; Ariss, 2009; Murjan & Ruza, 2002). Out of the five studies that consider the competitiveness environment in the GCC banking sectors, 80% point to monopolistic competition and 20% to perfect competition. The studies that track the change in the market concentration levels indicate that in most of the GCC countries the concentration of the banking sector declined between 1993 and 2002 (Al-Muharrami, 2009; Al-Muharrami et al., 2006). Kuwait is the exception, where the market concentration levels of its banking sector increased during this period (Al-Muharrami, 2008).

2.3.3 Project II: An Empirical Investigation of the Finance-Growth Nexus

The study investigates the extent to which the banking sector depth is linked to long-term economic growth in the GCC States in comparison with the other countries that are not dependent on natural resources. The NRBC are used as a proxy for the GCC States due to data limitations. In this investigation, three relationship dimensions are considered. The first is the type of relationship, the second is the time lag between the change in the banking sector depth and its effect of economic growth, while the third is the relationship magnitude. The thesis employs a global database for the period from 1961 to 2013 and estimates the relationships in dynamic panel data models using a GMM estimator for the NRBC and the rest of the world countries.

2.3.3.1 Research Method & Design

The empirical analysis in Project II (as well as Project III) employs the system GMM for dynamic panel data models. A dynamic panel data model is one that is characterised by the presence of lagged dependent variables on the right-hand side of the regression equation. The GMM, according to Lars Peter Hansen, "refers to a class of estimators which are constructed from exploiting the sample moment counterparts of the population moment conditions (sometimes known as orthogonality conditions) of the data generating model" (2008, p.1). Levine et al. (2000) state that the dynamic panel GMM estimators are designed to overcome some of the econometric problems faced by other empirical methods in the finance-growth nexus, including those associated with the "unobserved country-specific effects and joint endogeneity of the explanatory variables in lagged-dependent variables models, such as growth regressions" (p. 33).

The system GMM estimators are used to investigate banking-growth nexus in the NRBC vis-à-vis the other world countries along three relationship dimensions in Project II. The models investigate the relationship type, time lag, and magnitude for various combinations of banking sector depth ratios and long-term economic growth measures. The models are estimated for the NRBC group and the 'all other countries' group using the various combinations of four economic growth proxies and five banking sector depth variables. The database employed consists of 194 countries over the period from 1961 to 2013.

To eliminate statistically invalid models and arrive at the appropriate combination of explanatory variables' time lag, the thesis follows the general to specific approach when estimating the dynamic panel data models. The selected models thus satisfy a number of statistical tests including the second-order serial correlation and the over identification tests. To ensure research reliability and validity, certain model specifications related to whether explanatory variables are treated as endogenous or exogenous, the number of instruments used, and the estimation steps, are employed.

2.3.3.2 Key Findings

The empirical analyses illustrate that the relationship between the two variables in the NRBC and the rest of the world countries is non-monotonic in both country groups and is only positive within certain levels of banking sector depth.[4] According to the results, out of the 23 statistically significant and valid models for the NRBC, 13 report a positive relationship between the banking sector depth and economic growth variables. This is compared to 32 out of 38 models that suggest positive links in the case of the other countries group.

When considering the findings of the estimators for the NRBC group, the models employing the credit to private sector to GDP ratio reveal positive finance-growth relationships in four out of five models. This is compared to three out of five in the case of the estimators using the bank liabilities to GDP ratio as a banking sector proxy. In contrast, the models including the broad money supply to GDP ratio show that the development of the banking sector is harmful for long-term economic growth in two out of the three models reported.

For the group of other countries, all of the estimators that use the bank assets to GDP ratio, the money supply to GDP ratio, and the broad money supply to GDP ratio report positive associations between the banking sector depth measures and the economic growth proxies. The results of the models employing the credit to private sector to GDP ratio are along the same lines, with four of the five models showing a positive link between the two variables. The exception, in the case of the other countries group, is the findings of the estimators that employ the banking liabilities to GDP ratio as an explanatory variable. In all of the five statistically significant models, the results indicate that a higher level of banking liabilities to GDP ratio is negative for economic growth.

[4] Non-monotonic and non-linear relationships are used interchangeably in this thesis. A positive non-linear banking-growth relationship implies that a positive association exists between banking sector depth measure and economic growth proxy up to certain levels of the banking sector depth beyond which the relationship between the two variables turns negative. A negative non-linear banking-growth nexus indicates that the relationship between the banking sector depth measure and economic growth is negative up to given levels of sector depth beyond which the relationship between the two variables turns positive.

In relation to the time lag between the change in the banking sector depth and the effect on long-term economic growth, the empirical models indicate that the time lag is shorter in the case of the NRBC group than in the other countries group. The average lag periods reported by all the models assessing the finance-growth nexus for the NRBC group is 1.17, compared to 1.58 for the other countries group. In the case of the NRBC group only, the time lag average for the models using the credit to private sector to GDP ratio and the bank liabilities to GDP ratio is 0.40. In contrast, the average time lag for the estimators that use the bank assets to GDP ratio and the broad money supply to GDP ratio are 1.88 and 2 respectively. For the group of other countries, the average time period between the change in credit to private sector to GDP ratio and economic growth is 0.60. This is while the average time length for the models including the bank assets to GDP ratio as the independent variable is the highest for the group of other countries at 2 time lags.

Finally, the banking-growth nexus empirical investigation reveals that the total effect of the banking sector deepening on economic growth is lower in the NRBC group compared to the countries that are not dependent on natural resources. The average total effect for the level models that set the real GDP per capita level as the dependent variable is 0.14 for the NRBC group and 0.23 for the other countries group. This is while, for the models assessing the influence of the real GDP per capita growth rate, the average values are 3.44 for the NRBC group and 3.08 for the other countries group.

The average total effect of the five financial development indicators on the real gross national income (GNI) per capita level is higher for the other countries group than for the NRBC group for the models using the level as well as the squared specifications. For the NRBC group, the average effect of a 1% increase in the banking sector measures leads to a 10.7% fall in the pace of the real GNI per capita growth rate while it results in a 2.42% increase in the pace of the same economic growth measure in the case of the other countries group.

Once again, the average total impact of the financial development indicators on the total investment to GDP ratio is negative for the NRBC group at -0.15 and is positive for the

other countries group at 0.22 when the level models are considered. Finally, the level models that estimate the total influence of the banking sector depth proxies on the total private investment to GDP ratio report average values of 0.08 and 0.09 for the NRBC and the other countries groups respectively.

2.3.4 Project III: Empirical Analyses of the Banking Sector Depth Determinants & Status

The importance of the banking sector development for encouraging long-term economic growth in the NRBC, demonstrated by the empirical models results, prompted the study of the determinants and status of the sector development in the context of the GCC States with the aim of providing policy recommendation. The research investigates the levels of banking sector depth and the determinants of the banking sector development, as well as examines the effects of changing the levels of the determinants on the status of the sector's depth in the Gulf States.

2.3.4.1 Research Method & Design

In Project III, there are two sets of model that have been estimated. The first set includes the models stating the relationship between the banking sector depth and long-term economic growth using different combinations of dependent and independent variables and are estimated with the mixed effects method. The second set of models consists of dynamic panel data models that investigate the determinants of the banking sector depth. The latter models have been estimated using the system GMM estimator. The two model sets are estimated using a dataset that consists of 214 countries spanning the period from 1961 to 2013.

The mixed effects modelling, according to Hamilton (2012), is a regression analysis that allows for fixed effects, where the intercepts and slopes describe the whole population, as well as random effects, where the intercepts and slopes vary across the sample subgroups.

The mixed effects model is selected for estimating the relationship between the banking sector depth and long-term economic growth to derive the predictions of the slope coefficients for the individual countries. As explained in more detail in the project, the

predictions are required to facilitate the ranking of countries by the level of the banking sector influence on long-term economic growth. Other methods that can provide such estimators include the standard ordinary least squares (OLS), the fixed effects, and the random effects models. Due to data and model limitations, the mixed effects method is selected over the others.

To ensure the research validity, the thesis utilises a number of banking sector depth and economic growth measures when estimating the banking-growth relationship. The intention behind selecting different proxies is to ensure that the two variables are measured using a range of narrow and broad proxies. The mixed effects models are subjected to a number of statistical tests and specifications to ensure the reliability of their findings.

As mentioned above, the system GMM for dynamic panel data models is employed in Project III to explore the banking sector depth determinants in the countries in which the banking sector stimulates long-term economic growth the most. The models are subjected to the general to specific approach as well as statistical tests, including second-order serial correlation and over identification tests. The regression equations of the selected banking sector determinant models are then used for benchmarking and simulating the development of the banking sectors in each of the GCC States.

The study employs a novel benchmarking process where countries in which the banking sector depth has the highest positive effect on long-term economic growth are identified and ranked according to a pre-set scoring system. Then the data for the countries at the top quartile of the ranking are used to find the banking sector depth determinants in those countries. Finally, the banking sector depth determinants' equations are used to benchmark the GCC States' banking sectors. Following the benchmarking, the project simulates the changes in the banking sector development, given the changes in its determinants for the Gulf countries.

2.3.4.2 Key Findings

The initial steps employed in the benchmarking process are intended to identify the countries in which the banking sector promotes long-term economic growth the most.

The results of the mixed effects models and the ranking system suggest that the finance-growth nexus is most manifested in the countries listed in Table 1.

Table 1: Countries with Most Positive Banking Sectors for Economic Growth

1 Japan	3 Switzerland	5 Israel	7 Armenia	7 Hong Kong SAR, China
2 Austria	4 Cameroon	5 Malaysia	7 Belarus	7 Italy
2 Korea, Rep.	4 Russian Federation	5 United States	7 Botswana	7 Kuwait
3 France	5 Belgium	6 Azerbaijan	7 Congo, Dem. Rep.	7 Malta
3 Latvia	5 Brunei Darussalam	6 Bahamas, The	7 Congo, Rep.	7 Panama
3 Mauritius	5 China	6 India	7 Egypt, Arab Rep.	7 Trinidad and Tobago
3 Sri Lanka	5 Germany	6 Mexico	7 Equatorial Guinea	

The empirical models using the data for the countries in Table 1 show that factors associated with banking sector structure, macroeconomics, and governance, institutional and legal settings are significant determinants of the banking sector development.

The results also reveal that a number of the banking sector depth stability, efficiency and competition variables are statistically significant in three out of four banking sector depth determinant models. In the model concerned with the credit to private sector to GDP ratio, the level of banking sector competition measured by bank concentration is found to be significant, with the slope coefficient suggesting that higher competition levels promote the sector development. The banking sector efficiency—proxied by the net interest margin—is a determinant of the bank liabilities to GDP ratio in countries with banking sectors that promote long-term economic growth the most. In addition, bank stability has transpired to be an important factor that conditions financial depth in the sector. The empirical models also show that the z-score is positively associated with the money supply to GDP ratio.

Out of the various macroeconomic and demographic variables included in the general models, three measures are found to be of statistical significance in the banking sector depth determinant models. The first is the consumer price index (CPI), which revealed that higher levels of inflation deter the development of the banking sector. The second and third are linked to the savings and consumption levels within the economy. Both the savings to GDP ratio and the consumption to GDP ratio are found to be negatively associated with the money supply to GDP ratio.

Finally, variables related to the governance, institutional, and legal indicators' category transpired to be important for economies in which the banking sector has been instrumental in precipitating the highest levels of economic growth. The results of three banking sector depth determinant models demonstrate that regulatory quality, rule of law, and political stability are all positively linked to the banking sector depth proxies.

The benchmarking models of the banking sectors in the GCC States yield, to a great extent, consistent results; this suggests that the sectors are underdeveloped in all but one of the member countries. The status of the sector development is assessed using four proxies of banking sector depth. The first is the credit to GDP ratio which indicates that Kuwait, Oman, Qatar, Saudi Arabia, and the UAE are considered to be underdeveloped while Bahrain is overdeveloped.[5] The second and third ratios are the bank assets to GDP and the bank liabilities to GDP ratios. The findings are similar to those associated with the credit to private sector to GDP ratio where all the GCC member countries have underdeveloped banking sectors except Bahrain. The final banking sector depth measure considered is the money supply to GDP ratio. The benchmarking results indicate that all the GCC States have underdeveloped banking sectors.

The thesis projects the development of the banking sector in the region under different scenarios using the linear relationship between four banking sector depth ratios and the banking sector determinants. The first scenario is the base scenario, which assumes that the banking sector determinant factors remain constant over the ten year simulation period. In contrast, the second scenario assumes that all the determinant factors converge linearly over a period of five years to the levels of countries in which the banking sector influences the growth in the levels of income the most.

Under the base scenario, the findings suggest that Oman and Saudi Arabia are expected to see their banking sector depth ratios increasing by 5% over a ten year period on

[5] The status is determined by comparing the calculated level of banking sector depth based on the benchmarking model, which employs the latest levels of relevant determinants, with the actual level of banking sector depth in each country. The sector is considered overdeveloped when the actual measure is higher than the one derived by the model and underdeveloped when the opposite is true.

average, while Bahrain will lose as much as 18% of its sector depth on average if relevant determinants are maintained at their initial levels. The findings of the convergence scenario show that all the GCC member countries are anticipated to experience further banking sector deepening, ranging from 3% to 23% on average. Once again, Oman and Saudi Arabia are projected to undergo the most sector development among their peers under the convergence scenario. Comparing the expected changes in the GCC's banking sectors under the two scenarios, however, reveals that Kuwait and Bahrain would benefit the most from undertaking policies that converge their banking sector determinants over the analysed period than from maintaining the *status quo*.

3 Discussion of the Findings

This section discusses the findings of the thesis in relation to those of the literature. The section also considers the significance of results as well as demonstrates how the findings address the research questions.

3.1 Findings in Relation to the Literature

The findings of the SLR provide evidence of a positive link between financial development and long-term economic growth in the individual NRBC. This is in line with the conclusion of Beck (2011) which is the first and only study to our knowledge that comprehensively examines whether the finance-growth relationship differs in the resource-based economies in comparison to other countries. Using country-, industry-, bank- and firm-level data for 153 countries for the period from 1960 to 2007, Beck (2011) demonstrates both that banking sector development encourages long-term economic growth and that there is no significant difference in the relationship in the resource-rich countries in comparison to other countries.

The recently published papers on the finance-growth nexus in the GCC States that are not part of the SLR, generally report that the banking sector deepening spurs long-term economic growth. Scholars employing time series analysis techniques show that a relationship exists between financial development and economic growth—with some reporting Granger causality running from the banking sector development to economic

growth—in Bahrain (Altaee & Al-Jafari, 2014), Qatar (Alkhuzaim, 2014), Saudi Arabia (Al-Malki & Alassaf, 2014; Marashdeh & Al-Malkawi, 2014) and the UAE (Sbia & Al-Rousan, 2015). In contrast, Rehman et al. (2015) suggest that no long-term finance-growth relationship exists in the case of Bahrain.

One study that examines the relationship in the GCC region as a whole using panel data models suggests that the development of Islamic banking — as opposed to conventional banking — promotes economic growth. Muhammad et al. (2015), in comparison, by employing pooled OLS, fixed effects, random effects and the system GMM estimators, find that the financial sector development has a positive impact on the GCC economies. It is important to emphasise that this thesis does not employ the GMM estimator to assess the relationship in the six Gulf States due to the number of countries in the panel relative to the minimum number of instruments that can be used in the models. It is unclear how Muhammad et al. (2015) limit the number of instruments in the system GMM estimators to avoid overfitting the endogenous variables and weakening the joint validity test. The "minimally arbitrary rule of thumb" is to limit the number of instruments employed to the number of countries in the panel (Roodman, 2006, p. 13).

The empirical investigation of the banking-growth nexus in this thesis, however, reports different findings from those provided by the literature, particularly for the NRBC group. The results of the estimators provided here show that the total effect of banking sector deepening on long-term economic growth tends to be smaller in the NRBC group than in the other countries group. The different conclusions are related to the differences in the data and method involved in each research. Conclusions derived by Beck (2011) are based on one measure of banking sector depth, namely the credit to private sector to GDP ratio, and one economic growth indicator. In addition, Beck uses a cross-country regression model as opposed to the dynamic panel data GMM model employed here.

Another paper that is related to the current thesis is that of Barajas et al. (2013b). Their paper considers the effect of financial deepening on economic growth across different regions, income levels, and type of economies. They also show that economic growth benefits obtained from financial deepening are smaller in the oil exporting countries

group and fall continuously with the degree of oil dependence. As such, the latter is similar to the findings of this thesis.

Levine et al.'s (2000) research is closely related to this thesis in terms of the investigation method adopted. The authors pioneered the use of the GMM estimator for the dynamic panel data models in the area of the finance-growth nexus. They include the data for 74 countries in their models and illustrate that the development of financial intermediaries exerts a large, positive impact on economic growth. In contrast to Levine et al. (2000), the results reported by the various models in this thesis show that the total effects of banking sector deepening on economic growth vary more. This is perhaps explained by the data range employed here, which includes data associated with the Global Financial Crisis of 2008-2009.

The final paper that is strongly linked to the banking-growth nexus investigation of this thesis is that of Arcand et al. (2012). Their paper is one of the first in the literature to show that the banking sector depth measure becomes statistically significant and suggests that beyond a certain level the relationship between financial development and long-term economic growth turns from positive to negative. Project II illustrates that different results are derived when employing the GMM estimator for the dynamic panel data models with similar specifications to those employed by Arcand et al. (2012) but using other measures of banking sector deepening. Out of the 27 quadratic equation models, 17 estimators demonstrate that the banking-growth nexus is positive up to a certain level beyond which the relationship becomes negative in both the NRBC group and the other countries group. This is while ten estimators suggest an opposite relationship, where deepening of the banking sector is initially negative for economic growth but after a certain threshold turns positive.

Other more recent papers in the literature confirm the non-monotonic relationship between banking sector depth and long-term economic growth globally (Beck et al., 2014; Breitenlechner et al., 2015; Cecchetti & Kharroubi, 2012; Ductor & Grechyna, 2015; Gründler & Weitzel, 2013; Law & Singh, 2014), in the Organisation for Economic Co-operation and Development (OECD), European Union (EU), and/or

Group of Twenty (G20) countries (Cournède & Denk, 2015; Prochniak & Wasiak, 2016), in the middle-income countries (Samargandi et al., 2015), and in East Asia and Latin America (Aizenman et al., 2015).

In relation to the level at which banking-growth relationship turns from positive to negative, scholars estimate panel data models using OLS, pooled instrumental variable (IV) and GMM show that the turning point range is between 80% to 100% private credit to GDP (Breitenlechner et al., 2015; Cecchetti & Kharroubi, 2012; Cournède & Denk, 2015). Some researchers explain that the change in the nature of the relationship is due to the misallocation of resources (Ductor & Grechyna, 2015) or "financial Dutch disease", where the boom in the financial services divert long-term funding away from manufacturing and other sectors that relay on stable external finance (Aizenman et al., 2015). It is argued that "policies aimed at limiting excessive leverage and risk-taking as well as requiring banks to refocus their business models towards the provision of credit could ensure that financial deepening has positive growth effects even in mature financial systems" (Beck et al., 2014, p. 384).

The results of the banking sector development determinants models for the 34 countries with banking sectors that stimulate long-term economic growth the most (hereafter referred to as the top quartile countries) are similar to those reported in the general literature on the sector development determinants in a number of cases and provide new findings in others.

In relation to the factors associated with the banking sector structure, the thesis shows that higher levels of banking sector competition, efficiency, and stability encourage the deepening of the sector in the top quartile countries. Barajas et al. (2013a) show that the assets concentration of the largest five banks is negatively linked to financial deepening. Demirgüç-Kunt and Huizinga (1999) find that the higher the bank assets to GDP ratios, the lower the interest margins. No other paper to our knowledge reports the opposite, where efficient banking sectors prompt banking sector depth, as this thesis reports. Another novel finding in relation to the banking sector development determinants

literature reported here is the positive effect of the lower probability of banking sector insolvency for the sector deepening.

The thesis also demonstrates that three macroeconomic factors are important for the development of the banking sector. The first is inflation, which confirms the earlier findings of Barajas et al. (2013a), Boyd et al. (1996, 2001), Chinn and Ito (2006), and Djankov et al. (2007), among others, that higher prices deter the development of the banking sector in general. The second and the third macroeconomic determinants are savings and consumption; the research adds new empirical evidence to the literature by establishing that the last two factors are negatively linked to the sector development. The paper that highlights the theoretical underpinning of savings as a structural variable that determines the supply and demand for financial services is that of Beck et al. (2012).

In addition, the banking sector depth determinant models suggest that both the governance and institutional factors are instrumental in affecting sectoral deepening. The first factor is political stability and the absence of violence. The findings confirm the previous results of Girma and Shortland (2004) in which political stability contributes to the development of the banking sector. The second governance and institutional factor is the rule of law. The results illustrate the significance of the rule of law for banking sector deepening. This is in line with the findings of the established literature which explores the importance of investors' protection, law origins, and law enforcements for the development of the financial sector, led by the seminal work of La Porta et al. (1997, 1998). The final governance and institutional factor that contributes positively to the deepening of the banking sector is regulatory quality. Apart from Huang (2010a) who includes the measure as an element of a governance index, no other study in the banking depth determinant and benchmarking literature employs the regulatory quality measure. The findings of this present study in relation to regulatory quality, political stability and absence of violence, and rule of law, lend support to those of Huang (2010a) which illustrates that good governance stimulates the banking sector development.

In addressing the second research question of this study, the banking sector depth models for the countries with the strongest banking-growth nexus are used to assess the status of the banking sector development in the GCC countries. The findings are, to a great extent, coherent. The banking sectors in five of the six States are considered to be underdeveloped. Considering the history of the banking sectors in the GCC, the results are not surprising. Bahrain, as the only country with an overdeveloped banking sector in most of the models, has been considered a regional financial hub since the early 1980s (Gerakis & Roncesvalles, 1983) while the other GCC States only undergo economic reforms and accelerated liberalisation after the year 2000 (Srairi, 2011b).

3.2 A Discussion of the Findings' Significance

The findings of this research are significant for the natural resource-rich economies in general and the Gulf States in particular. The next two subsections discuss how the findings answer the overarching research questions and highlight their importance for the NRBC and the GCC States.

3.2.1 Stimulating Economic Growth in the NRBC

In answering the first research question which enquires about the nature of the banking-growth nexus in the GCC States, the research employs the NRBC as a proxy in investigating the relationship, as discussed earlier. By illustrating that the banking sector deepening is positive for long-term economic growth in the NRBC—though at a lower magnitude than the other world countries—and that the time lag between the change in the level of the sector depth and the effect on growth is relatively shorter in economies dependent on natural resources, the thesis findings are considered vital for NRBC looking to stimulate their economic growth. The natural resource curse literature suggests that countries with abundant natural resources exhibit slower growth rates than countries without such resources (Frankel, 2010). The findings thus identify an economic sector that the NRBC can consider developing further to accelerate their rates of long-term economic growth.

Another important finding pertaining to the banking-growth relationship in the NRBC is that the relationship between the two variables is non-linear. Accordingly, the natural resource-rich economies can enhance the positive contribution of their banking sectors

to economic growth by assessing the level of their sector development and undertaking regulations and policies that maintain the sector depth levels within a certain range as discussed below in the policy implications section.

3.2.2 Diversifying the Economies & Preserving the Living Standards in the GCC

As highlighted in the introduction, the governments across the Gulf region strive to diversify their economies away from the hydrocarbon sector and attain sustainable long-term economic growth rates that would maintain the current levels of income and living standards of their people going forward. Those goals, which are placed at the forefront of all the governments' policies and strategy agendas in the GCC area, are required to be met today more than at any other time in the recent history of the region.

Between June 2014 and February 2016, the price of the most active crude oil future contract trading on the New York Mercantile Exchange (NYMEX) dropped more than 75% in value from USD 107.26 to as low as USD 26.21 on the daily closing before ending the first quarter of 2016 at USD 38.34. The collapse in the crude oil prices and the subsequent change to the crude oil outlook over the medium-term are expected to result in fiscal shortfalls of as much as USD 900 billion in the Gulf States by 2021, with Bahrain, Oman, and Saudi Arabia exhausting all their reserves in less than five years according to the IMF (Feteha, 2015; Pronina, 2016). This reflects the high dependency of the GCC's government budgets on the hydrocarbon sector revenues.

Governments across the region, as a result, are considering more than ever the various options to change the structures of their economies to overcome the current challenges and become more sustainable. The findings of this research contribute to attaining the goals of diversifying the Gulf economies and generating sustainable long-term growth.

As highlighted in the previous subsection, the thesis finds that the banking sector development, within certain levels, stimulates long-term economic growth in the NRBC group to which the GCC States belong. In addressing the second overarching research question that asks about the status of the banking sector development in the Gulf countries, the thesis demonstrates that most of the countries in the region have

underdeveloped banking sectors. Thus the banking sectors in this region are well positioned to take a greater role in their economies. The development of the banking sector contributes directly to the diversification of the GCC economies by growing its size relative to the hydrocarbon sector and indirectly by supporting the growth of the other economic sectors that depend on bank debt for their development. Further, the deepening of the banking sector in the Gulf is expected to prompt higher levels of real income in the long-term.

Finally, the thesis considers the third overarching research question—which is related to the policy implications of the banking-growth nexus and the status of the banking sector development in the GCC region—by identifying the banking sector development determinants in the top quartile countries and simulating the sector development in the Gulf States under different scenarios.

The banking sector depth determinants identified here can guide policymakers aiming at developing their banking sectors. As discussed below in more detail in the policy implications section, policymakers in the GCC States can assess the status of the banking sectors' development determinants in their countries relative to those in the top quartile countries. By undertaking regulations and policies that converge the banking sector depth determinants in the Gulf States to those of the top quartile, governments would develop banking sectors that accelerate long-term economic growth considerably. It is worthwhile highlighting that the findings of the banking sector development determinant models are relevant to all countries and can be employed by policymakers globally to achieve the same goal.

The significance of the simulation results of this thesis for the region lies in the thesis' projection that in the absence of regulations and policies that converge the banking sector development determinants to those of the top quartile countries, a number of banking sectors in the region would experience deterioration in their levels of development. The simulation results suggest that among the GCC countries, Bahrain and Kuwait are required to take steps that aim at converging their sector development determinants to those of the top quartile to maintain or improve the status of their

banking sectors. For the other countries, the simulation findings show that their banking sectors are set to undergo further development even if all the determinants were held constant. The findings are thus valuable for underscoring the possible benefits of converging the banking sector development determinants to those of the top quartile and the urgency for taking steps in this regard for each country.

4 Contribution to Theory

The thesis contributes to the theoretical arguments encountered in the specific literature by exploring new research directions through the adoption of state of the art methodological frameworks, thus generating evidence that either supports contemporary theoretical approaches or expands the current body of knowledge. The key highlights of this contribution are summarised in this section.

An SLR methodology provides the platform upon which the review of the relevant literature was explored. Given that the application of the aforementioned methodological framework is predominantly found in disciplines such as medical sciences and education (Tranfield et al., 2003), our effort to investigate the literature in the area of finance and economics is rather novel, adding considerably to current practice in the context of the finance-growth nexus literature investigation.

The contribution and relevance to the extant literature is dual in the sense that the thesis considers all the research papers that investigate the banking sector in the GCC region as well as surveys all the papers that look into the relationship between the banking sector development and economic growth in the natural resource-rich countries.

More specifically, despite the growth of this relatively underdeveloped literature over the last decade or so, there is a lack of literature reviews that critically examine and discuss the scholarly papers focused on the banking sectors in the Gulf States. The first SLR fills this gap in the literature. Unlike the case of the GCC's banking sector literature, the finance-growth nexus literature is well established with scholars assessing the relationship using various datasets and methods for individual countries, specific

regions and country groups as well as cross-country. Accordingly, a number of researchers over the years have reviewed the literature concerned with the link between financial development and economic growth (see for instance Ang, 2008; Levine, 2005) but none of those has reviewed the relationship in the context of the NRBC.

The application of the SLR facilitates the synthesis of the findings of the reviewed papers, which allows drawing conclusions about the overall findings of the literature. In the case of the first review, its findings contribute to the literature by identifying and highlighting certain characteristics and trends in the banking sectors across the Gulf region. By synthesising the results of the studies that investigate certain aspects of the banking sector in the individual GCC countries, the SLR draws conclusions that can be the basis for further research.

The second review contributes to the finance-growth nexus by emphasising the importance of the development of the banking sectors in the NRBC and identifying areas to explore in future studies. The SLR demonstrates that the general findings of studies assessing the relationship in the natural resource dependent economies suggest a role for the development of the banking sector in accelerating long-term economic growth. The review, however, suggests that the literature in this area is still lacking in studies that consider the nature of the relationship between banking sector depth and long-term levels of income in the NRBC group in comparison to the relationship in the other world countries.

The empirical analyses presented in this thesis build on the latter findings of the SLR and offer a comparative study of the banking-finance nexus in the two country groups, thus making it the first to do so in the literature. The study also adds to the development of the research topic through its use of data and methodologies. In estimating the relationship for each country group, the thesis uses several banking sector depth and economic growth proxies—including the GNI growth rate and total investment to GDP ratio—some of which were previously not employed in the literature. Studies of the finance-growth relationship usually employ fewer variables in their empirical models.

Further, this research explores the nature of the relationship between the variables along three dimensions for each country group. In comparison to the literature, this study is different in its consideration of the time dimension of the relationship. It is interesting to find that the time lag between the change in the level of the banking sector depth and its effect on the long-term economic growth is shorter in the NRBC group than in the other world countries group. This new finding invites scholars interested in researching the natural resource-rich economies to explain this difference.

The thesis also adds to the body of knowledge by extending the recent findings in the literature, which suggest that the relationship between the deepening of the banking sector and long-term economic growth is non-linear, to the NRBC. The results of the regression models employing the quadratic equations illustrate that the development of the banking sector encourages economies' growth only up to certain levels of the sector development; beyond such levels, the banking sector starts to hinder economic growth.

The assessment of the banking sector development in the GCC States undertaken here is the first of its kind to the author's knowledge. Apart from contributing to the development of the GCC's banking sector literature, the benchmarking results highlight whether each member country is underdeveloped or overdeveloped, given its banking sector development determinant factor levels. The results expand our understanding of the banking sectors in the Gulf region and the aspects that encourage or hinder their development.

In deriving the benchmarking equations, the research examines the banking sector determinants in the top quartile countries. The banking sector development determinant literature focuses on the factors that influence the sector development in general. The results presented here pertain to the factors that determine the banking sectors in countries in which the levels of the sector development stimulate economic growth the most. As reported above, some determinant factors are in line with those reported by the general literature while others are novel.

A final contribution to knowledge in relation to the methodology adopted in this thesis is the benchmarking process. Unlike the banking sector benchmarking literature, where studies employ the data available for all the countries in a given region, income group, or globally in assessing the status of the banking sector development, this research only uses the data for the top quartile countries. The benchmarking models in the literature thus assess the status of the banking sector development in a given country against the mean of all the countries included in the study with no regard to the significance of the banking sectors for economic growth in those countries. Those studies overlook whether the banking sectors in the countries against which they benchmark encourage or hinder long-term economic growth. In contrast, selecting the top quartile countries ensures that the banking sectors assessed are benchmarked against peers which stimulate their countries' levels of economic growth the most.

In addition, the benchmarking process presented here takes the literature closer to estimating the financial possibility frontier. The concept introduced by Beck et al. (2012) is defined as "the maximum *sustainable* depth (e.g., credit or deposit volumes), outreach (e.g., share of population reached) or breadth of a financial system (e.g., diversity of domestic sources of long-term finance) that can be realistically achieved at a given point in time" (p. 42, italics in the original). Beck et al. (2012) suggest that the empirical estimation of the concept is challenging due to the need to include numerous state variables that influence financial deepening. More advanced empirical methods are thus required going forward to fully estimate the financial possibility frontier.

It is worthwhile noting that the benchmarking process introduced in this thesis can also be applied in other disciplines where researchers are concerned with identifying the determinants of a certain phenomenon. For instance, a scholar interested in investigating the factors influencing the quality of higher education in countries in which undergraduate degrees have the most positive effect on earnings can use the benchmarking process to assess the level of higher education quality in certain countries in relation to those in which university graduates enjoy higher incomes.

Table 2: Summary of the contributions to literature & policy

	Contribution to Literature		*Policy Implications*	*Relevant Group*
	Confirm	*Novel*		
Research Topic				
1- Comparing the banking-growth relationship in the NRBC vis-à-vis other countries	✗	–	✓	NRBC & Other
2- Investigates the banking sector depth determinants in the top quartile countries	✓	✓	✓	Top quartile
3- Assessing the levels of banking sectors development in the GCC States	–	✓	✓	GCC
Literature Review				
4- SLR of the Finance-growth nexus in the NRBC	✓	✓	–	NRBC
5- GCC's banking sector SLR	–	✓	–	GCC
Data & Variables				
6- Employing more banking sector depth & economic growth proxies	–	✓	–	NRBC & Other
Method				
7- Use of system GMM to assess the banking-growth nexus in the NRBC	–	✓	–	NRBC
8- Investigates the banking-growth relationship use three dimensions	–	✓	–	NRBC & Other
9- Benchmarking method	–	✓	–	GCC
Findings				
10- Non-linear relationship between banking sector depth & LT economic growth in the NRBC	–	✓	✓	NRBC
11- Set of factors influencing the banking sector depth in the top quartile countries	–	✓	✓	All countries
12- Underdevelopment of most of the banking sectors in the GCC	–	✓	✓	GCC
13- Simulation findings	–	✓	✓	GCC

5 Policy Implications

The findings of the thesis have a number of policy implications for all the countries keen on possessing banking sectors that stimulate long-term economic growth, the NRBC looking to develop their financial sectors diversifying away from the natural

resource on which they depend, and the GCC States that are determined more than at any other time to change their economic structure to generate more sustainable growth.

The findings associated with the investigation of the banking sector development determinants in this study show that in countries where the banking sector development plays an instrumental role in promoting long-term economic growth, certain banking sector structure characteristics, macroeconomic variables, and governance, institutional and legal settings are significant for the sector development. The findings thus inform policymakers about the determinants that are required to be assessed when setting regulations and policies aimed at optimising the positive influence of their banking sectors on economic growth. In a country in which the banking industry exhibits competition levels beyond those of its peers in the top quartile countries, for instance, policymakers might opt to adopt regulations that control the over-competitive market conditions.

For the NRBC, the findings of the various empirical models employed here confirm the importance of the banking sector development for generating long-term economic growth. In the light of the natural resources curse, governments in the natural resource-rich countries are eager to identify economic sectors that can generate higher levels of income. The findings would thus prompt the NRBC to devote resources and undertake regulations and policies that target the development of their banking sectors.

Since the results illustrate that the banking-growth relationship is non-linear for the NRBC where the positive association turns negative beyond certain levels of banking sector development, countries belonging to this group thus need to assess at which stage of the banking sector development they stand. Underdeveloped as well as overdeveloped banking sectors tend to be harmful for economic growth according to the results. Understanding at what stage of banking sector development a country stands, enables the country to decide on the appropriate level of resources and the suitable regulations that would ensure a banking sector development level that is beneficial for economic growth.

In relation to the Gulf countries, the emerging evidence generated suggests that five out of the six member countries have underdeveloped banking sectors. The findings inform policymakers in the GCC States about the status of their banking sectors' development using a number of benchmarking models. The results suggest that, within certain levels of banking sector deepening, the banking industry accelerating long-term economic growth along with the status of the sector development in the region would prompt policymakers to undertake steps towards developing this significant sector for their economies.

This is particularly relevant, given the recent collapse in crude oil prices. Governments in the Gulf region are under considerable pressure to undertake structural economic reforms in the face of the emerging fiscal and economic challenges. In April 2016, Saudi Arabia, the largest GCC economy by GDP size, announced its 2030 Vision which reveals the Kingdom's aspiration to become among the top 25 most competitive countries globally, make the private sector the main economic driver by increasing its contribution to GDP from 40% to 65%, and reduce the government fiscal dependency on oil revenues through increasing the non-oil government revenues from USD 43 billion to USD 267 billion by 2030, among other ambitious goals (Al-Arabiya, 2016). Such movement is an example of the willingness in the region to embark on changes that would make the Gulf economy more sustainable in the long-term.

For each of the GCC States, the research highlights the banking sector development determinants that ought to be considered in order to build a sector contributing effectively to the economic growth of those nations. The findings indicate the need to enhance the banking sectors' competitiveness, efficiency and stability, to reassess the spending and savings behaviour, and, more importantly, for steps to improve the rule of law, regulatory quality and political stability in the region. Legislators and policymakers are thus invited to consider those findings and take decisions that aim at enhancing the determinant factors to the levels of those in the top quartile countries. Indeed, steps towards improving the governance, institutional and legal settings are desirable on their own and likely to have favourable ramifications for the region beyond the development of effective banking sectors.

Finally, the simulation results emphasise the significance of taking such steps for all the Gulf States. Despite the fact that the results predict that over a decade period the banking sectors in half of the member countries will exhibit further development in their banking sectors under the current levels of the banking sector development determinants, the pace and level of development can be accelerated by undertaking regulations and policies that converge the determinant factors on those of the top quartile countries. Further, the simulation findings suggest that Bahrain and Kuwait are expected to see their banking sector development levels deteriorate in the coming years if the current levels of the sector development determinant factors are sustained. Accordingly, policymakers in both countries are urged to take measures that ensure their banking sector development levels are maintained or improved going forward.

6 Further Research & Study Limitations

This section discusses how the findings of this thesis inform future research. It highlights potential research topics related to trends in the banking sector and its role in the GCC economy, the special nature of the finance-growth nexus and the negative effects of the underdevelopment of the banking sectors in the NRBC, the use of different sector development dimensions, and the benchmarking of banking sector development in other countries. The section also critically assesses the thesis and recognises its limitations. The research limitations reported are associated with the background discussion of the Gulf countries and their banking sectors, the data and variables selected in the banking-growth relationship models, and the banking sector development determinants' results for the top quartile countries.

6.1 Further Research

The SLR reports trends in the GCC banking sector's efficiency, productivity and competition levels. Such trends are captured by studies using the same proxies and models for each sector aspect. Further research that employs different variables and methodologies is required to ensure the validity of the findings. In addition, the SLR demonstrates that while the banking sectors in the Gulf States are more efficient and

profitable than their counterparts in the other Middle East and North Africa (MENA) countries, they are less competitive in comparison. Market economic theory suggests that higher levels of competition would induce better resources allocation, improving the efficiency of the firms. Researching this area would explain the existence of such a phenomenon in the MENA region.

Research shows that industries more dependent on debt finance grow faster in countries with more advanced financial sectors (Rajan & Zingales, 1998). Evaluating the economic sectors that benefit most from the development of the banking sectors in the NRBC would inform policymakers in those countries about the effect of the sector development on the structure of the economy. This is particularly relevant to the Gulf States, where economic diversification is highly desired.

In the context of the NRBC, the results of this research suggest that the underdevelopment of the banking sector has negative consequences for long-term economic growth. As the sector develops, the relationship between banking depth and economic growth turns from negative to positive. Further research that explains this relationship is desired in order to assist governments in the natural resource-rich countries with underdeveloped banking sectors on how to mitigate the negative effects of their banking sectors.

The research results also indicate that the banking-growth relationship's overall effect is smaller while the time between cause and effect is shorter in the NRBC than in the other world countries. Understanding those unique aspects can contribute to theory as well as policy by adding to our knowledge in relation to the natural resource dependent economies and their characteristics.

One of the key economic events in the recent history of the financial system and global economy was the global financial crisis of 2008-2009 that resulted in prolonged and devastating consequences for financial markets and economies around the globe. Such a significant event might lead to a structural break in the finance-growth nexus and ought to be controlled for in future studies. In the case of the NRBC, researchers can also

consider the relationship before and after the crisis to assess whether this event influenced the link between the development of the banking sector and long-term economic growth. Alternatively, future research can employ a crisis-banking sector depth interaction variable in the banking-growth nexus models to capture the effect of the crisis on the relationship in the context of the NRBC group.

In the literature, financial development has four dimensions: depth, access, efficiency and stability (Čihák et al., 2012). This thesis considers banking sector development using the depth element due to the limited cross-country data for variables associated with the three other dimensions. As more data become available, further research will be able to explore the banking sector relationship to economic growth and assess the status of the banking sector development in the different country groups considered here using all the other development dimensions.

The banking sector development benchmarking process introduced in this study can be applied to assess the status of the sector development in more countries and regions. As in the case of this research, studies applying the benchmarking tool to other countries will contribute to policy by guiding governments on the development status of their banking sectors as well as determinant factors that need to be considered when adjusting their levels of sector development.

The research findings suggest that a set of banking sector structures, and macroeconomic, governance, institutional and legal factors, determine the banking sector development in the top quartile countries. More research is needed to understand why this set of factors is significant in those countries while other factors encountered in the literature are not. An example is the statistical significance of the rule of law as a determinant of banking sector depth in the top quartile countries but not the English law dummy variable that is found to be important in the general literature. In addition, future research can extend the findings of this project by examining the differences in the impact of the banking sector determinants. We should be able to answer why political stability and absence of violence influences the sector development more than regulatory quality for instance.

6.2 Study Limitations

The first research limitation is related to the lack of background discussion of the individual GCC States and their banking sectors. Readers who are unfamiliar with the Gulf countries would need to refer to other sources to generally appreciate the economic development of each member country in recent years. This is particularly relevant in relation to the banking sector development and regulations in each country. Further background information would enhance the research context and enrich the discussion of the research results.

The second research limitation is associated with estimating empirical models for the Gulf countries. The lack of sufficient data for the GCC States prevents the research from considering finance-growth models that focus on those countries. In fact, the thesis estimates a number of dynamic panel GMM models that employ the NRBC group data and uses interaction explanatory variables to capture the relationship for the GCC countries. Those estimators, however, are not reported due to model misspecification problems related to the limited data employed. As more data for the Gulf States become available and more advanced econometric models are developed, further research should overcome such obstacles and be able to estimate the long-term finance-growth econometric models that are specific to the GCC countries.

Another limitation related to data availability is the use of banking sector depth measures as a proxy for banking sector development in this research. The thesis would benefit from estimating the finance-growth nexus models as well as the banking sector development determinants' equations for the top quartile countries using the access, efficiency and stability aspects of the banking sector development. The research would assess the relevance of the sector development for economic growth in the NRBC, vis-à-vis the other world countries, using the various sector development dimensions. Further, the banking sector development determinant models might reveal other significant determinant factors that ought to be taken into account.

A further limitation worth noting relates to understanding the nature of the banking sector in the top quartile countries. The research does not assess the characteristics of the banking sector in those countries beyond their depth determinants. Expanding the research in the direction of evaluating the various banking structure parameters and identifying similarities among the sectors in the top quartile countries can enrich the findings of the study in general and for the GCC States in particular.

Finally, the thesis bases its findings on the results of country-level data and models. The use of bank-level data in investigating the finance-growth nexus could lead to different results for the country groups under consideration. In this sense, considering bank-level data would act as a catalyst in enhancing our understanding of the finance-growth nexus theoretical framework.

Project I

Banking Sector Development & Economic Growth in the GCC: A Systematic Literature Review

Abstract

The thesis intends to highlight the findings of the literature that consider the relationship between the banking sector development and economic growth in the context of the GCC countries and identify areas for further research. The thesis employs the systematic literature review (SLR) method to investigate the finance-growth nexus literature in the context of the natural resource-based economies as well as the banking sector literature in the GCC region. Although the literature provides evidence suggesting a positive relationship between banking sector development and long-term economic growth in the economies with abundant natural resources, the findings in relation to the relationship for the GCC region are inconclusive. The systematic review also shows that the banking sectors in the region are more efficient and profitable than their counterparts in the Middle East and North Africa region and that the banks in most of the GCC region operate within a monopolistic competition market environment. The thesis proposes questions in relation to finance-growth nexus as well as the relationship between banking development and economic diversification.

1 Introduction

Since the discovery of oil and natural gas in the early 20th century, the hydrocarbon sector has become the main driver of economic growth and development in the GCC member countries. The revenue windfalls from the sale of crude oil, natural gas, and later the associated petrochemical products enabled the government across the region to provide various public services and invest in the infrastructure of their countries. The GCC's experience transformed the life of the people in the region by improving their living standards to the levels of those in the developed nations.

The governments of the region understand that the current economic model, which is highly dependent on the natural resources, is unsustainable. Today, diversifying the economy away from the hydrocarbon sector is at the forefront of the economic

strategies and policies in the GCC region. The governments across the region aim to encourage the development of other economic sectors that can provide new employment opportunities for the growing young population segment, higher levels of income, and sustainable long-term economic growth.

One of the potential sectors for the region is the banking sector. Economic research into other countries and regions provides evidence of a positive relationship between banking sector development and long-term economic growth. In addition, the literature suggests that financial intermediaries provide funding for new projects and the growth plans of entrepreneurs and firms. This, in turn, can contribute to the development of the other economic sectors within the economy. Furthermore, despite that the financial sector the third largest contributor to the GCC's gross domestic product (GDP) after the hydrocarbon and government sectors, the banking sector in the region is underdeveloped relative to its peers in countries with similar levels of per capita income.

This research intends to review the literature that considers the relationship between the banking sector development and long-term economic growth in the natural resource-based countries (NRBC) in general and the GCC member countries in particular. The research also aims at reviewing the studies related to the banking sector in the GCC countries and region. The intention of these reviews is to address the review questions, highlight the current areas of research, and suggest topics for further research.

The reviews are conducted using the SLR approach. In comparison, the SLR "differ(s) from the traditional narrative reviews by adopting a replicable, scientific and transparent process, in other words a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit of the reviewers decisions, procedures and conclusions (Cook et al., 1997)" (Tranfield et al., 2003, p.209).

The SLR in this research addresses two review questions. The first is *"What is the nature of the relationship between banking sector development and long-term economic*

growth in the context of the resource-based economies in general and the GCC in particular?" The second is *"What are the characteristics of the banking sector in the GCC?"* The method is selected due to the limited and scattered literature in the area of the banking sector development and economic growth in the context of the GCC region, which requires thorough and systematic searches of the databases to ensure that all the relevant studies are located. Another reason for selecting the SLR is its standard data extraction and synthesis processes that enable the research to address the review questions using diverse studies from the research field.

The structure of the research is as follows. The first section introduces the research area of finance-growth nexus, the development of the research area, and the different theoretical stances and empirical findings in the research field. The second section provides a short introduction to the SLR method, highlights the basis for selecting the method for reviewing the literature, and lays out the SLR protocol. This is followed by a section that reports the findings associated with the two review questions. The fourth section discusses the motives behind conducting a research in the area of the banking sector development and economic growth nexus while the fifth section recommends areas for further research. The final section provides research conclusions and closing remarks. A summary of the structure of the research is provided in Figure 1.

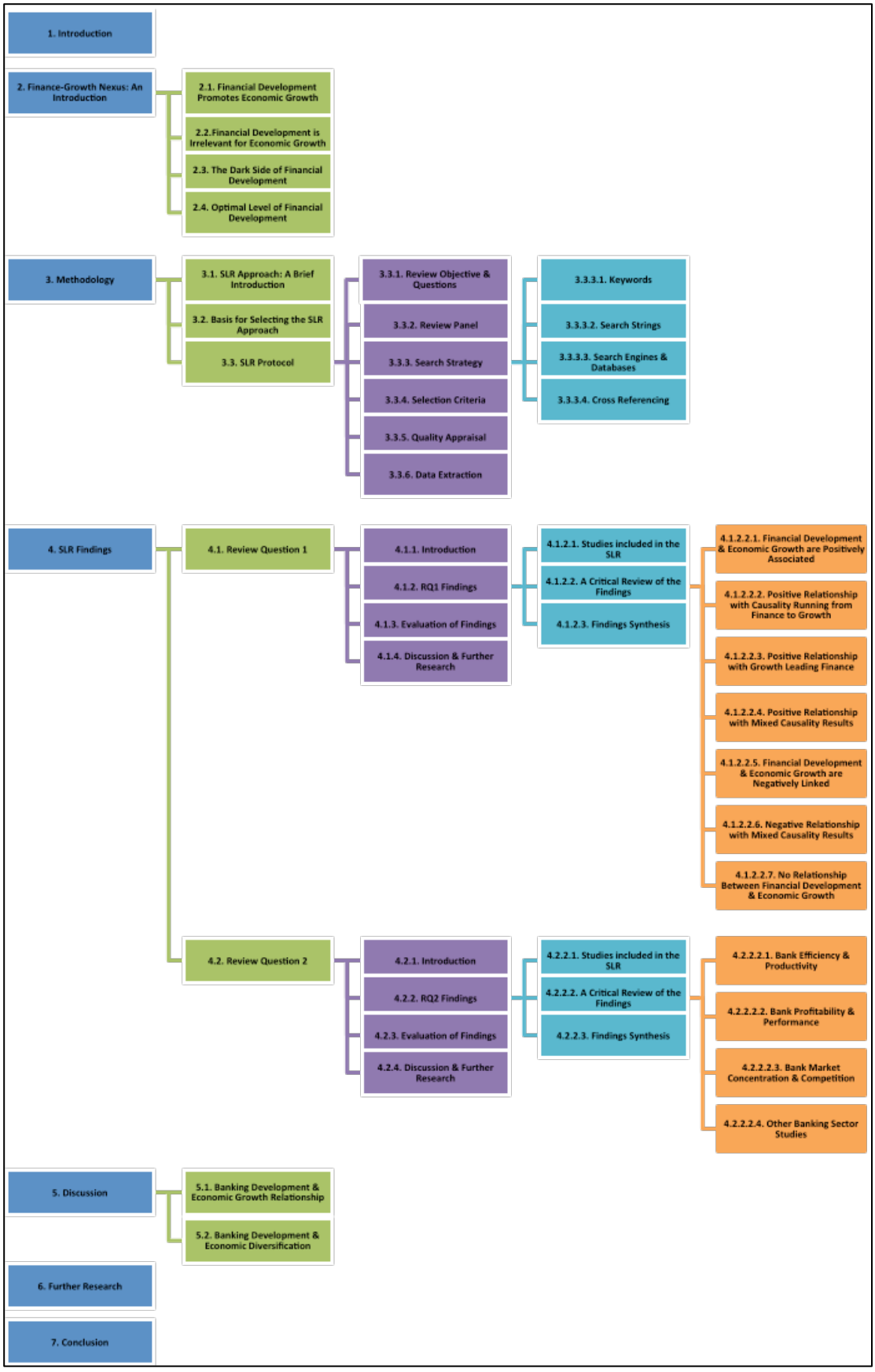

Figure 1. Research Structure of the Project I

2 Finance-Growth Nexus

Over the years many scholars have debated the effect of financial development on economic growth. The financial development for some promotes long-term economic growth by overcoming market frictions, while for others the development of the financial sector is irrelevant and only follows economic growth. A number of scholars, particularly following the Global Financial Crisis of 2008-2009, also show that the development of the financial industry has negative implications for economic growth. More recently, research in the finance-growth nexus area contends that that there is an optimal level of financial development for long-term economic growth.

This section aims to introduce the research area of finance-growth nexus, the development of the research area, and the different theoretical stances and empirical findings in the field. To do so, the first subsection discusses the studies contending that financial development promotes economic growth. The second subsection reviews some of the papers which suggest that the development of the banking sector is irrelevant for economic growth. This is followed by a review of the research which argues that the development of the financial industry hinders economic growth. The final subsection considers the recently emerging view that an optimal level of financial development for economic growth exists.

2.1 Financial Development Promotes Economic Growth

One of the earliest contributors to this area is Bagehot who in 1873 suggested that the main difference between Britain and poorer nations in the 19th century was the ability of its financial intermediaries to channel funds from the "quiet saving districts" to the "active employing districts" across the country (2009, p.9). However, Joseph Schumpeter in *The Theory of Economic Development* of 1934 contends that financial intermediaries play a vital role in identifying and directing capital to entrepreneurs with innovative projects that stimulate economic growth (Schumpeter, 2012).

Over the last two decades, economists have attempted to explain the importance of the financial sector due to the existence of market frictions.[6] It is argued that the financial sector overcomes the market frictions of asymmetric information and transaction costs[7] that prevent markets from clearing.[8] Levine (2005) summarises the role of the financial sector in the following five points: (i) producing information *ex ante* on potential investments and allocating capital, (ii) monitoring investments and enhancing corporate governance of the borrowing firms, (iii) facilitating the trading, diversification and risk management, (iv) mobilising and pooling savings, and (v) facilitating the exchange of goods and services.

The view that the development of the financial sector stimulates long-term economic growth is supported by the early empirical findings of Goldsmith (1969) and King and Levine (1993a) which employ cross-country regression analyses to investigate the relationship. Interested in the nature of the relationship and the direction of causality, Gupta (1984) and Jung (1986) use time series analysis. The former finds a unidirectional causal relationship running from financial development to economic growth while the latter find a bidirectional relationship. More recent papers that investigate the direction of causality between the two variables using advanced statistical tests show either mixed results (Neusser & Kugler, 1998) or results supporting the unidirectional relationship running from financial development to economic growth (Xu, 2000). Since the year 2000, researches have also adopted the panel data analysis approach to overcome some of the constraints associated with the cross-country studies. Levine et al. (2000) and Beck et al. (2000) are the first to utilise panel data analysis along with more advanced econometrics approaches, such as IVs and GMM. The papers find a strong positive relationship between financial intermediary development and long-run economic growth.

[6] Defined here as the costs and impediments to exchange in any market.
[7] Asymmetric information is defined as the state where economic agents do not all hold the same information (Black, 1997). Transaction costs are the costs associated with bartering among economic agents.
[8] Markets clear when the quantity demanded equals the quantity supplied at the market price.

2.2 Financial Development is Irrelevant for Economic Growth

In contrast to the view that financial development promotes economic growth, Robinson (1953) argues that the development of the financial sector is merely a reflection of the development of the overall economy. As the economy grows in size, the demand for financial services increases and so the sector develops. However, Lucas (1988) sees the relationship between finance and growth as badly over-stressed by economists (cited in Levine, 1997). The latter represents the view held by mainstream economists, which suggests that the development of the financial sector is irrelevant for long-term economic growth.

The view is based on the Arrow-Debreu (1954) model—and later the Modigliani–Miller (1958) theorem. Under the assumption of complete markets and perfect certainty, the Arrow-Debreu model shows that economic agents, who are aware of the future values of interest rate and prices, maximise the firm value through certain calculation. Furthermore, economic agents can readily raise capital, and the use of debt finance or equity finance in raising capital by firms is equivalent. The role of financial markets in this theory is limited to providing the interest rate term structure while the stock markets are "informationally redundant" as the firm value can be simply derived from the prices of inputs, outputs and interest rates (Allen, 1999, p.3).

2.3 The Dark Side of Financial Development

Some economists argue that financial development, or at least its excess, is associated with financial instability and economic crises. The idea of financial instability can be traced back to Fisher (1933 cited in Schroeder, 2009) who argues that the departure beyond a certain limit from the stable state of equilibrium results in instability. This occurs when one or a group of debtors default on their obligations and subsequently a financial crash takes place. Schroeder (2009) states that mainstream economists tried to explain financial instability in the general equilibrium theory, which is mainly concerned with the allocation of resources and has difficulty incorporating money. Accordingly, the neoclassical synthesis and subsequent schools of thought that are based on the same theoretical framework are unable to endogenise financial instability in their theories.

The New Keynesians view financial instability as a result of market frictions such as imperfect and asymmetric information. Stiglitz and Weiss (1981), Mankiw (1986), Bernanke and Gertler (1989), and Greenwald and Stiglitz (1993) are examples of authors that link the level of financial intermediation and a firm's net worth through asymmetric information. The New Keynesians argue that an exogenous shock that reduces a firm's net worth has the potential to generate financial instability. The shock destabilises the economy by changing levels of both investment and economic output.

This is compared to the heterodox view that financial instability is endogenous in economic theory. According to Minsky (2008), bank lending and debt are central to investment and economic activities and the capitalist economy is inherently unstable and prone to crises. In his Financial Instability Hypothesis, Minsky argues that the economy goes through different stages over time and its status changes from one that is stable to unstable. The shift in the status of the economy takes place after a long period of stability that induces banks to take more risk by accelerating their lending. This results in higher asset prices, which in turn fuel market speculation and reckless lending activities. The cycle ends when the monetary authorities hike interest rates and asset prices start to fall, resulting in a financial turmoil. Wray (2011) follows Hyman Minsky in arguing that the economy in the post Second World War period exhibited a slow transformation from one that is characterised as "robust" to one that is "fragile".

Rajan (2006) also examines the development of the financial sector in the second half of the 20th century and argues that the changes in the financial sector have altered the managerial incentives that in turn changed the nature of risks undertaken and exposed the financial system to greater probability of a "catastrophic meltdown". Whereas de la Torre et al. (2011) believe that financial development has a "dark side". This view is backed by the Global Financial Crisis in which the apparent progress in financial development exacerbated market failures that in turn undermined financial stability. De la Torre et al. (2011) argue that there are two "finance maladies". The first is associated with the inability to overcome agency frictions or collective frictions that prevent or delay financial development. The second is related to the apparently successful financial

development that reduces both agency and collective frictions resulting in the increased fragility of the financial system.

2.4 Optimal Level of Financial Development

A more recent view on the finance-growth nexus suggests that at the different levels of economic development, an optimal level of financial development exists for economic growth. Graff and Karmann (2006) investigate whether or not there is an optimal level of financial activities and if the contribution of the financial sector to economic growth differs at the various stages of financial development. Their paper finds a non-linear relationship between financial development and economic growth. Their findings show that the underdevelopment, as well as the overdevelopment, of the financial sector impairs its efficiency in contributing to growth and development.

Similarly, Arcand et al. (2012) contend that the relationship between financial depth and economic growth is positive up to a certain threshold after which the relationship turns negative. Their paper finds a strong positive relationship between financial depth and GDP growth in economies with small and intermediate financial sectors. The relationship, however, turns negative after a certain level of credit to the private sector relative to the GDP reaches a certain threshold (estimated to be around 80% to 100% of GDP). Based on the results that the non-monotonic relationship is not explained by the volatility, crises, and strict capital requirements, the authors suggest that the relationship is explained by the misallocation of resources view put forward by Tobin (1984). Tobin argues that an extensive financial sector results in a suboptimal allocation of resources as talents are shifted from productive sectors to the financial sector.

Beck et al. (2012) introduce the concept of a "Financial Possibility Frontier" that intends to define the maximum sustainable depth, outreach or breadth of the financial system using benchmarking to assess the level of financial development that can be realistically achieved for any country, given its current level of economic development. Although, at the current stage, the authors are unable to empirically estimate the financial possibility frontier for each type of financial activity and the system as a whole due to lack of data, their paper uses a statistical approach to benchmark the financial

systems against their expected level of financial deepening, given their structural depth. The estimation of the structural depth line is employed to point to financial services that are underprovided and the sectors or instruments that are underdeveloped in a certain country. Their paper also argues that the adoption of the financial possibility frontier allows countries to improve their macroeconomic and financial policies to provide an environment more conducive to financial deepening and eventually outperform their expected structural levels and become close to their frontier.

3 Methodology

The research adopts an SLR approach for selecting and critically reviewing studies from the field of banking development and economic growth in the resource-based economies as well as the banking sector characteristics in the GCC region. The section provides a short introduction to the SLR method, highlights the basis for selecting the method for reviewing the literature, and lays out the SLR protocol.

3.1 SLR Approach

The systematic literature review (SLR) is defined as "a review of evidence on a clearly formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyse data from the studies that are included in the review" (NHS Centre for Reviews and Dissemination, 2001, cited in Pilbeam, 2013, p.6). Unlike the traditional literature review, the systematic review employs a "replicable, scientific and transparent process" (Tranfield et al., 2003, p.209).

The SLR is systematic in the sense that it is undertaken in accordance with a method in relation to the review question which it intends to answer. The approach is transparent as it explicitly specifies the method employed in the review. The SLR is replicable since it clearly reports the method and the way it is conducted, enabling other researchers to repeat the review or update it. The approach also synthesises the findings of the reviewed papers in a structured and organised way in order to summarise the evidence related to the review questions (Briner & Denyer, 2012).

According to Briner et al. (2009) a systematic review rigorously addresses clearly set questions, involves a range of stakeholders in the process of setting the review questions and the distribution of the review results, entails searching published and unpublished research extensively, explicitly sets the studies inclusion criteria *ex ante*, reports the findings of the reviewed studies in a brief, transparent and accessible format, and summarises the final review outcomes into a set of practical conclusions.

3.2 Basis for Selecting the SLR Approach

The SLR approach is selected for two reasons. First, the limited and scattered literature requires thorough and systematic searches of the databases to ensure that all relevant studies are located. The number of the research papers concerned with the banking sector in the GCC area was limited to a handful of studies before the year 2000 and only over the last decade has the number grown rapidly (see Figures 3 and 6). Furthermore, the studies in this field are scattered in the sense that scholars tend to publish their work in various academic journals, working papers, and conference proceedings. This might reflect the lack of publications, particularly in academic journals, that focus on the banking sector studies in the region. Such publications help researchers interested in this area of study to locate the relevant papers effortlessly and swiftly. In addition, scholars in many cases fail to position their research within the relevant literature concerned with the region. This limits the possibility of locating research papers via cross-referencing.

In relation to addressing the second review question (please see section 3.3.1), a meta-analysis that synthesises the results of the various studies empirically presents an alternative to the SLR. The scattered literature and lack of cross-referencing, particularly in the case of the studies concerned with the MENA region, gives the SLR an advantage of the meta-analysis in allocating the relevant literature.

The second reason for selecting the SLR method for reviewing the literature is the diversity of the research in the banking sector literature. The approach provides standard data extraction; also synthesis processes enable the research to identify common

research themes and synthesise the findings of the studies included in the review in order to answer the review questions.

3.3 SLR Protocol

The SLR protocol discusses the different stages of the approach. The next subsection considers the review objectives and questions, the composition of the review panel, the SLR search strategy, the SLR selection criteria, the quality appraisal of the selected studies, the data extraction process, and the data synthesis.

3.3.1 Review Objectives & Questions

The specific objective of the SLR is to inform the research about the theoretical and empirical studies in the area of banking sector development and economic growth in the context of the resource-based economies and the GCC in particular, and the characteristics of the banking sector in the GCC region.

In order to accomplish the SLR objectives, clear and precise review questions are required to be set. The review questions enable the researcher to identify the relevant search and selection criteria when reviewing the literature. Further, the review questions ensure that the research investigates specific questions and problems. "[T]he question guides the review by defining which studies will be included, what the search strategy to identify the relevant primary studies should be, and which data need to be extracted from each study. Ask a poor question and you will get a poor review" (Counsell, 1997, p.381, cited in Briner & Denyer, 2012). The review questions for the SLR are as follows:

- What is the nature of the relationship between banking sector development and long-term economic growth in the context of the resource-based economies in general and the GCC in particular?
- What are the characteristics of the banking sector in the GCC?

3.3.2 Review Panel

The SLR panel consists of experts in the areas of theory and methodology and is aimed at directing the process through regular meetings and resolving any dispute over what is to be included and excluded in the research (Tranfield et al., 2003). The panel for the

proposed SLR includes three subject experts and one methodology specialist. A list of the panel members is provided in Table 3.

Table 3: SLR Panel Members

Name of the Panel Member	*Position & Organisation*	*Role within the Panel*
Dr. Constantinos Alexiou	Associate Professor (Reader) in Economics, School of Management, Cranfield University	Lead supervisor & subject expert
Dr. Catarina Figueira	Associate Professor (Reader) in Applied Economics and Director of the Cranfield Centre for Economic Performance and Policy., School of Management, Cranfield University	Subject expert
Professor Joe Nellis	Professor of Global Economy, Cranfield University	Subject expert
Dr. Heather Skipworth	Senior Research Fellow, School of Management, Cranfield University	Methodology expert

3.3.3 Search Strategy

In applying the SLR search method to the literature, searching terms and strings are set and search databases selected. The chosen search keywords are based on the review questions and the scoping study of the topic. The aim is to identify and employ keywords in the SLR search, which specifically address the review questions and use terms that are prevalent in the literature. The latter is to ensure that the relevant literature is considered. A summary of the proposed search strategy process is given in the following points:

- Analyse the review questions to identify the key search domains,
- Specify relevant keywords associated with each search domain,
- Set search strings that align the search results with the review questions,
- Select databases that consist of significant research sources for the search domains,
- Apply the search using the selected keywords and strings to assess the relevance of the outcome,
- Amend the search keywords and strings, and repeat the search if required.

3.3.3.1 Keywords

The review questions suggest three research domains. The first is banking sector development, the second is long-term economic growth, and the third is resource-

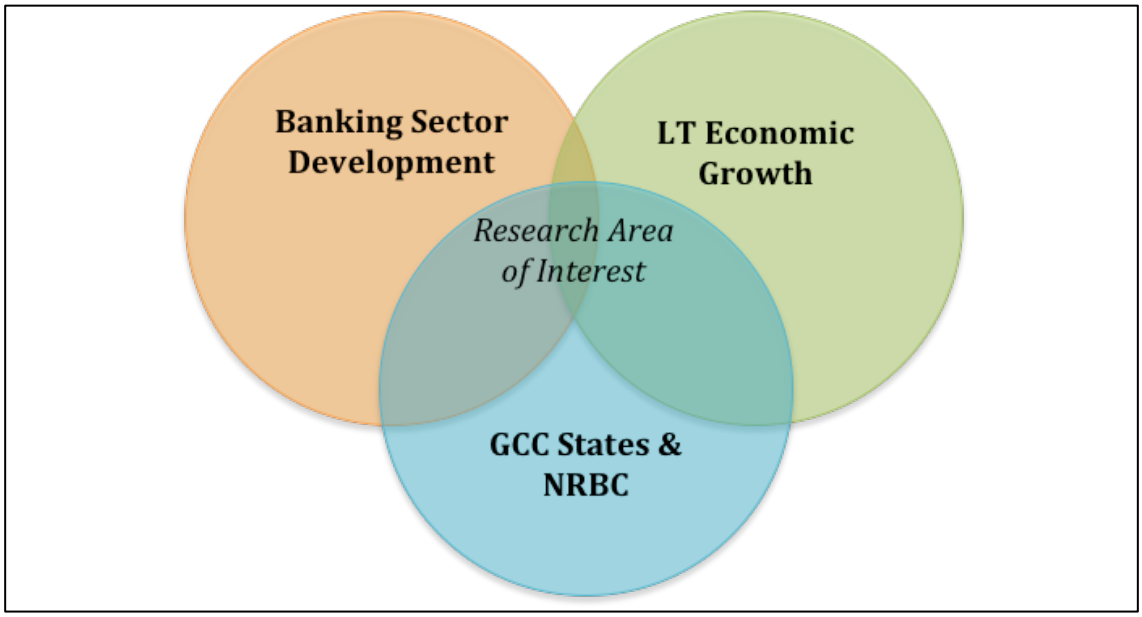

Figure 2. Research Domains

based economies and particularly the GCC region. Based on the scoping study and the literature, the following keywords for each domain are identified and listed in Table 4.

Table 4: Keywords

Search Domains	*Keywords*
Banking Sector Development	Banking sector development, access, depth, deepening, credit, efficiency, stability, inclusion
Economic Growth	Economic growth, GDP, gross domestic product, GNP, gross national product, income, living standards, productivity
Resource-Based Economies	Resource based economies, resource curse, natural resources, Dutch Disease, rentier state, diversification, hydrocarbon, oil, natural gas, petroleum, coal, diamond, gold, platinum, minerals
Gulf Cooperation Council States	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, KSA, United Arab Emirates, UAE, Gulf Cooperation Council, GCC, Middle East, MENA

3.3.3.2 Search Strings

To restrict the search outcomes associated with each review question to relevant studies, search strings are employed. For instance, the search strings applied to the keywords

related to the first review question aim at studies that investigate the various elements of the banking sector development in relation to productivity and income in the context of the resource-based economies and the GCC region in particular. The search strings for each review question are shown in Table 5.

Table 5: Search Strings

Review Question	*Search Strings*
What is the nature of the relationship between *banking sector development* and *long-term economic growth* in the context of the *resource-based economies* in general and *the GCC* in particular?	("Bank*" OR "Financial*") AND ("Access" OR "Credit" OR "Depth" OR "Deepening" OR "Development" OR "Efficiency" OR "Stability" OR "Inclusion") AND ("Economic growth" OR "GDP" OR "Gross domestic product" OR "GNP" OR "Gross National Product" OR "Income" OR "Living Standards" OR "Productivity") AND ("Resource Based Econom*" OR "Resource Curse" OR "Natural Resource" OR "Dutch Disease" OR "Rentier State" OR "Diversification" OR "Hydrocarbon" OR "Oil" OR "Natural Gas" OR "Petroleum" OR "Coal" "Diamond" OR "Gold" OR "Platinum" OR "Minerals" OR "Bahrain" OR "GCC" OR "Gulf Cooperation Council" OR "Kuwait" OR "MENA" OR "Middle East" OR "Oman" OR "Qatar" OR "Saudi Arabia" OR "UAE" OR "United Arab Emirates")
What are the *characteristics* of the *banking sector* in *the GCC*?	("Character*" OR "Attribut*" OR "Featur*" OR "Qualit*" OR "Propert*" OR "Trait*" OR "Aspect*" OR "Element*" OR "Facet*" OR "Manner*" OR "Habit*" OR "Custom*" OR "Way*" OR "Mark*" OR "Trademark*" OR "Hallmark*" OR "Distinct*" OR "Idiosyncras*" OR

	"Peculiarit*" OR "Quirk*" OR "Oddity*" OR "Foibl*" OR "Penchant*" OR "Proclivit*" OR "Bent*")[9] AND ("Bank*" OR "Financial*") AND ("Bahrain" OR "GCC" OR "Gulf Cooperation Council" OR "Kuwait" OR "MENA" OR "Middle East" OR "Oman" OR "Qatar" OR "Saudi Arabia" OR "UAE" OR "United Arab Emirates")

3.3.3.3 Search Engines & Databases

The SLR is undertaken using search engines and databases. The first is the ABI/INFORM database, which covers approximately 3,900 leading international journals in Business, Economics and Finance. The second is the EBSCO Business Sources database, which includes over 1,900 peer-reviewed journals in all Business disciplines including Economics and Finance. The two databases are also complemented with IDEAS, a search engine and a database with over half a million working papers in Economics. The decision to include the latter reflects the fact that working papers are significant for research in the field of Economics and Finance. According to Azar (2006) the citation of working papers in the American Economic Review and Econometrica (two of the leading journals in Economics) increased from 3% in 1960 to 14% in 2002, constituting the second largest source of citations after scholarly journals. Azar suggests that the increasing importance of the working papers is due to the longer first-response time of Economics journals, which has led researchers to publish and read working papers that contain the latest research in the field.

[9] Synonyms for the word "Characteristics" are based on those in the Oxford Dictionaries (2014).

Table 6: Summary of the Selected Search Engines and Databases

Name	*Description*
ABI/INFORM	Database with approximately 3,900 leading international journals in Business, Economics and Finance
EBSCO Business Sources	Database that contains over 1,900 peer-reviewed journals in all Business disciplines
IDEAS	A search engine and a database with over 500,000 working papers in Economics and Business

However, Ellison (2011) finds that the new communication technologies have provided researchers in the highest-ranked economics departments with channels in which to disseminate their research without subjecting it to peer reviews.

3.3.3.4 Cross Referencing

The SLR also examines the references of the studies considered and identifies the relevant studies that are not part of the keywords' search outcomes. In addition, relevant research papers that were identified in the scoping study that preceded this thesis are also considered for inclusion in the SLR. Similarly, studies recommended by the supervisor, the review panel, and colleagues are assessed. All the studies under this section are subject to the same selection and quality assessment criteria applied to the studies obtained using the keyword searches.

3.3.4 Selection Criteria

Searching the literature using the search keywords and strings has yielded studies from various research fields, from different sources, and in different languages. Accordingly, not all the studies from the keywords search are relevant or appropriate for the research and further screening is required. A selection criterion is thus applied to ensure that the study topic, the context, the publication type, the publication date, and the language of the studies under consideration are relevant and suitable. Tables 7 and 8 provide the selection criteria for each review question.

Table 7: Inclusion & Exclusion Criteria for Review Question I

Criteria	*Inclusion*	*Exclusion*	*Rationale*
Study Topic	I. The relationship between banking sector development and economic growth II. The relationship between financial development and economic growth	The relationship between financial markets' development and economic growth	Address the review question specifically and exclude studies that consider only the relationship between the financial markets and growth
Context	Resource-based economies with focus on the GCC countries	All other countries	The review question specifies the resource-based economies and the GCC
Research Methodology Type	All	None	To include studies that address the review question using different research methodologies
Publication Type	Academic journal articles and working papers	Book chapters, conference papers and proceedings, articles posted on Internet websites and blogs, newspaper articles, magazine articles, and academic theses	Relevant studies are expected to be found in journal articles and working papers. The lack of means to systematically review the other publication types
Publication Date	All	None	To ensure all relevant publications are included in the review
Journal Ranking	All	None	Limited publication in the context of the resource-based economies and the GCC States necessitates including all journals
Language	English	All other languages	Inability to search databases in other languages due to language barriers. The absence of large databases in some other languages that prevent conducting a systematic search of the literature

Table 8: Inclusion & Exclusion Criteria for Review Question II

Criteria	*Inclusion*	*Exclusion*	*Rationale*
Study Topic	I. Banking sector in the GCC region and states II. Economic structure of the GCC region and states		No exclusion criteria is set to cover all the available studies in this underdeveloped area of research
Context	GCC countries	All other countries	The review question
Research Methodology Type	All	None	To include studies that address the review question using different research methodologies
Publication Type	Academic journal articles and working papers	Book chapters, conference papers and proceedings, articles posted on Internet websites and blogs, newspaper articles, magazine articles, and academic theses	Relevant studies are expected to be found in journal articles and working papers. The lack of means to systematically review the other publication types
Publication Date	All	None	To ensure all relevant publications are included in the review
Journal Ranking	All	None	Limited publication in the context of the GCC States necessitates including all journals
Language	English	All other languages	Inability to search databases in other languages due to language barriers. The absence of large databases in some other languages that prevent conducting a systematic search of the literature

In identifying the relevant studies, the selection criteria are first employed by subjecting the keyword search outcomes to the publication type, publication date, journal rating, and the language criteria; then the study topic and context criteria are applied at the title and abstract level. The studies that meet the criteria are finally reviewed in full to ensure their relevance.

3.3.5 Quality Appraisal

Subsequently the quality of the selected studies is assessed using a predetermined quality appraisal criterion. The objective is to assess the overall quality of the selected studies and limit the review to studies with medium to high research standards. This is particularly pertinent as the selected studies can include working papers that have not necessarily been subject to peer reviewing and are not published in any journal. As Table 9 shows, the quality appraisal is based on seven elements related to the research problem: the knowledge of the field, the research positioning, the methodology and data, the robustness of the argument, the research contribution, and the structure, writing accuracy and referencing.

Table 9: Quality Appraisal Criteria

Element	*0 - Absence*	*1 - Low*	*2 - Medium*	*3 - High*
Research Questions & Problems	Not enough information in the study to assess this criteria	No explicit research questions are set. The research problem is not defined	Basic research questions and problem description are in place	Research questions and problems are well-defined and the research objectives clearly set
Knowledge of the Field	Not enough information in the study to assess this criteria	Poor awareness of existing literature and debates. Under- or over-referenced	Basic understanding of the issues around the topic being discussed	Deep and broad knowledge of the literature and theory relevant for addressing the research
Research Positioning	Not enough information in the study to assess this criteria	Research is not positioned in relation to the literature	Research is implicitly positioned within the literature	Research is explicitly positioned within the literature
Methodology & Data Suitability	Not enough information in the study to assess this criteria	Unsuitable research design and/or data not related to theory	Research design can be improved and data are related to arguments but there are some gaps	Robust research design and data are strongly related to theory
Argument Robustness	Not enough information in the study to assess this criteria	Ambiguous claims that are backed by weak evidence and warrants	Reasonable claims that are supported by adequate evidence and warrants	Claims are clearly articulated and are supported by strong evidence and coherent warrants
Contribution to Knowledge	Not enough information in the study to assess this criteria	No important contribution is made	Builds on existing literature using different ideas	Further develops existing knowledge, providing new explanation of the issue under consideration
Structure, Writing Accuracy & Referencing	Not enough information in the study to assess this criteria	Study has an imbalanced or illogical structure, with regular spelling, grammar and punctuation mistakes, and/or missing and inaccurate references	Study structure is broadly balanced and logical with some minor spelling, grammar and punctuation errors, and/or infrequent referencing mistakes	Study has balanced and logical structure, with correct spelling, grammar and punctuation, and accurate referencing

The quality appraisal criteria is adopted from Pittaway et al. (2004) and supplemented with elements suggested by my lead supervisor. In addition, the Cranfield University (2012) marking scheme for research papers is used in setting the different standard categories for some elements.

In applying the quality appraisal criteria, the review will only consider studies that meet the medium or high quality standard in all seven elements. All other studies are excluded to protect the quality of the SLR findings and conclusion.

3.3.6 Data Extraction

Following the selection of the studies to be included in the SLR, specific data are extracted from each study. The data extraction process is intended to obtain key information from each study associated with its purpose and claims, methodology and model, findings and contributions, and significance for the review question. To extract the data, a standard form (see box 1) is employed.

Box 1. Data Extraction Form

Citation
Title of the study
Author(s)
Year of publication
Journal
Background
Literature type
Research method
Theme/Topic
Research question(s)
Claim(s)
Methodology & Model
(a) Theoretical Studies
Type of model
Context
Variables
Assumptions
(b) Empirical Studies
Type of data
Data Source
Data frequency
Year the data starts
Year data ends
Countries studied
Development group
Sectors
Companies researched
Variables
Model(s)
Results
Findings
Contribution
Further research
Summary
Study strengths
Study limitations
Overall evaluation
Other notes
Relevance to review question
(a) Review question I
Finance-growth relationship
Direction of causality
(b) Review question II
Characteristics of the GCC banking sector

3.3.7 Data Synthesis

The extracted data are finally synthesised to answer the review questions and identify areas for further research. This is achieved by examining and comparing the reviewed studies and their findings in relation to the review questions. For the first review question, for instance, the findings of the different studies that investigate the relationship between the banking sector development and economic growth in the resource-based economies would reveal whether or not a specific relationship persists in those economies. Further, a review of the studies enables us to highlight those areas that have been studied to date and identify areas that require further research.

4 SLR Findings

This section reports the systematic review findings of the selected studies. This first part of the section considers the findings associated with the first review question while the second part presents the findings of the second review question.

4.1 Review Question I

4.1.1 Introduction

This section intends to critically review the existing research studies associated with the following review question: "What is the nature of the relationship between banking sector development and long-term economic growth in the context of the resource-based economies in general and the GCC in particular?" It is in this sense that the objective of the first review question is to inform us about the nature of the relationship in the resource-based economies and the GCC countries in particular. Furthermore, this review aims at highlighting the areas that are under-researched in the literature and require further exploration.

In passing, it should be noted that the envisaged review question is in line with Al-Moulani and Alexiou's (2014) study on banking sector development, economic growth and stability in the GCC countries where a lack of adequate research evidence in this particular region is highly emphasized. The extant finance-growth literature will provide

a broad framework within which the resource-based countries can be studied effectively. The generated evidence on the potentially unique relationships between the two variables in question will enable us to envisage additional research questions, which will deepen our understanding of the fundamental issue surrounding the theoretical aspects of our investigation.

The review question, however, has a number of limitations. Firstly, the question limits the review to the resource-based economies. As such, studies that consider the relationship in the non-oil exporting MENA countries, for instance, and provide evidence that is relevant to the GCC countries will be excluded from the review. Secondly, by focusing on the studies that investigate the relationship between financial development and income, the review question excludes all the potential studies that consider the financial development in the GCC region in general and underscore significant factors that can be employed to explain the finance-growth nexus in the region. The second review question, however, overcomes this issue by focusing on the characteristics of the banking sector in the GCC countries.

Table 10: Search Results for Review Question I

Search Engines & Databases	*Results Description*	*Number of Results*
ABI/INFORM	Number of results	1403
	Relevant based on titles	43
EBSCO Business Sources	Number of results	198
	Relevant based on titles	13
IDEAS	Number of results	483
	Relevant based on titles	15
Total	*Total number of results*	*2084*
	Total relevant	*71*

As Table 10 shows, the search results associated with the first review question yielded 2084 research studies. ABI/INFORM accounts for 67.3% of the total number of results. After reviewing the titles of all the results, the number of relevant research publications for the first review question is found to be 71 studies or 6.6% of all the results. Table 11 illustrates the inclusion and exclusion stages for the review question. Out of the 71 studies shortlisted, and based on their titles, 16 are excluded due to duplication, 22 are disregarded after abstract review, seven are added through cross-referencing, and seven

are dropped after full text review due to irrelevance or poor quality. The final number of research publications included for the review is, therefore, 33 studies.

Table 11: Inclusion & Exclusion Stages for Review Question I

Inclusion & Exclusion Stages	*Number of Studies*
Relevant studies based on titles	71
Duplicates	16
Relevant studies after excluding duplicates	55
Irrelevant studies based on abstract review	22
Number of relevant studies based on abstracts	33
Studies added through cross-referencing	7
Studies excluded after full review due to irrelevance or poor quality	7
Papers included in the SLR	*33*

The section is organised as follows. The first subsection presents, critically reviews, and synthesises the findings of the research studies associated with the first review question. This is followed by an evaluation of the studies' findings in relation to the review question. The final subsection discusses the area for further research.

4.1.2 RQ I Findings

4.1.2.1 Studies included in the SLR

The number of research studies included in the SLR for the first review question is 33. The earliest study included dates back to the year 1999 while the latest papers were published in 2013. Table 12 provides a summary of the names, year of publication, countries studied, models employed, and the findings of all research studies included.

Table 12: Summary of the studies included for RQ I

Author(s)	*Year*	*Countries Studied*	*Data*		*Model(s) Employed*	*Findings*	
			From	*To*		*Finance-Growth Nexus*	*Direction of Causality*
Ali F. Darrat	1999	Saudi Arabia, Turkey, and the UAE	1964	1993	The Augmented Dickey-Fuller, the Phillips-Perron, the Weighted-Symmetric, the Johansen-Juselius approach for cointegration, the error correction model (ECM)	A long-term relationship between financial development and economic growth exists	Direction of causality differs in each country
M. Nagy Eltony and Naief H. Al-Mutairi	2000	Kuwait	1975	1999	The Augmented Dickey-Fuller, Engle and Granger test for cointegration, the ECM	There is a long-term relationship between financial development and economic growth in the case of Kuwait	The results are mixed supporting both the supply-leading and the demand-following hypotheses. The results associated with the monetisation ratio and the mobilising longer-term assets suggest that financial deepening promotes short-term and long-term economic growth. This is while the currency ratio indicates that the development of the financial sector follows the real growth of the economy
Hussein A. Al-Tamimi, Mouawiya Al-Awad and Husni A. Charif	2001	Algeria, Bahrain, Egypt, Jordan, Kuwait, Morocco, Saudi Arabia and Syria	1952	1999	The Augmented Dickey-Fuller test, the Johansen and Granger procedures, the impulse response function	The paper provides evidence of a strong long-run in the financial development and economic growth relationship	The results are mixed
Thorvaldur Gylfason and Gylfi Zoega	2002	85 Countries	1965	1998	OLS regressions	Financial depth promotes economic growth	Not covered by the paper
Hong Leng Chuah and Van-Can Thai	2004	GCC countries	1962	2002	The Augmented Dickey-Fuller (ADF) test, the Johansen cointegration test, the ECM, the Vector Autoregressive (VAR) model, the Granger causality test	Long-term relationship between financial development and economic growth exists in the GCC region	In five out of six GCC countries, the causal relationship between finance and growth is bidirectional. Financial development is leading growth in Qatar
Ghazi Boulila and Mohamed Trabelsi	2004	Algeria, Bahrain, Egypt, Iran, Jordan, Kuwait, Mauritania, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, Turkey and United Arab Emirates	1960	2002	The ADF test, the Johanson cointegration procedures, the Granger causality test	A long-term relationship exists in nine out of the 15 countries included in the study	The paper finds mixed results
Thorvaldur Gylfason	2004	105 countries	1960	2002	Cross-country regression analysis	There is a positive relationship between financial development and economic growth	The direction of causality is not examined
Mouawiya Al-Awad and Nasri Harb	2005	Algeria, Egypt, Iran, Jordan, Kuwait, Morocco, Syria, Tunisia, Turkey	1969	2000	The Fully Modified Ordinary Least Squares (FMOLS), the Granger causality test, the multivariate Johansen cointegration test	At the panel level, there is a long-term relationship between finance and growth. The relationship is not very strong at the country level	The causality runs from economic growth to financial development at the panel level. There is no clear direction of causality at the country level

Kalid Al-Zubi, Samer Al-Rjoub, and E. Abu-Mhareb	2006	The countries included in this research are Algeria, Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Saudi Arabia, Sudan, Syria and Tunisia	1989	2001	The Pooled Least Squares model, the Fixed Effect Model , the Random Effect Model	Financial development is positively associated with economic growth when financial development is measured using the credit to public sector share of domestic credit variable	Not considered by the paper
Masoud Nili and Mahdi Rastad	2007	144 countries	1960	2001	The GMM model	The interaction between financial intermediation development and investment is negatively associated with economic growth in economies highly dependent on oil	Not covered by the paper
Nazanin Soukhakian	2007	Iran	1974	2004	The ADF, the Phillips-Perron root test, the λMAX, the Johansen test, and the vector error correction model (VECM)	A negative long-term relationship exists between financial development and economic growth	The causal relationship is bidirectional between finance and growth when domestic credit as a financial development measure is used while being unidirectional, running from growth to finance, when broad money is employed
Samy Ben Naceur and Samir Ghazouani	2007	The 11 MENA countries included in the study are Bahrain, Egypt, Iran, Jordan, Kuwait, Lebanon, Morocco, Oman, Saudi Arabia, Tunisia, and Turkey	1979	2003	The GMM model	The banking sector development measures are negatively associated with economic growth	Not considered by the paper
Suleiman Abu-Bader and Aamer S. Abu-Qarn	2008	Algeria, Egypt, Israel, Morocco, Syria, and Tunisia	1960	2004	Granger causality test and the VECM	Supports the view that financial development promotes long-term economic growth	The direction of causality runs from financial development to economic growth in five out of the six countries examined
Mina Baliamoune-Lutz	2008	Algeria, Egypt and Morocco	1960	2001	The Phillips-Perron unit root test, Johansen's cointegration test, a bivariate VECM, and the Granger causality test	There is a long-term relationship between banking sector development and economic growth in all three countries	The direction of causality is mixed across countries
Sufian Eltayeb Mohamed	2008	Sudan	1970	2004	The autoregressive distributed lag (ARDL) model, and the ECM	The empirical results show that the financial development indicators do not have a direct impact on real economic growth	Not considered by the paper
Mansur Masih, Ali Al-Elg and Haider Madani	2009	Saudi Arabia	1985	2004	The VECM, variance decomposition approach, the Johansen cointegration test, and the long-run structural modelling (LRSM) technique	A long-term relationship exists between bank deposit levels and economic growth	The causality runs from banking sector development (measured by bank deposit to GDP ratio) to economic growth
Mounther Barakat and Edward Waller	2010	Not disclosed	Not disclosed	Not disclosed	The multivariate regression models	Banking sector development is related to economic growth but the financial markets development is not	Not tested
Sambit Bhattacharyya and Roland Hodler	2010	133 countries	(a) 1970, (b) 1870	(a) 2005, (b) 1940	The panel data regression analyses	The authors argue that in a resource-rich economy, the strong and democratic political institutions foster financial development. Their	Not covered by the paper

						implicit assumption is that the development of the financial sector is relevant for the economy	
Mohamed Goaied and Seifallah Sassi	2011	Algeria, Bahrain, Egypt, UAE, Iran, Jordan Kuwait, Lebanon, Mauritania, Oman, Qatar, Saudi Arabia, Sudan, Tunisia, and Yemen	1962	2006	The GMM	A negative relationship exists between banking sector development and economic growth for the oil exporting countries and is positive for the non-oil exporting countries	NA
Muhsin Kar, Şaban Nazlıoğlu and Hüseyin Ağır	2011	15 MENA countries: Algeria, Bahrain, Egypt, Iran, Israel, Jordan, Kuwait, Libya, Morocco, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, and Turkey	1980	2007	The Seemingly Unrelated Regression (SUR) and Wald tests	The findings highlight that a relationship between financial development and economic growth exists for the MENA region	The causality tests provide different findings for each country. In general, the tests show that there is a strong causality running from economic growth to finance
Thorsten Beck	2011	153 countries	1960	2007	Barro-style standard cross-country regressions and a model that is based on that of Rajan and Zingales (1998)	Financial development is positively associated with long-term economic growth	Not considered by the paper
Husam-Aldin N. Al-Malkawi, Hazem A. Marashdeh and Naziruddin Abdullah	2012	UAE	1974	2008	The ARDL approach	A significant negative relationship exists between financial development and economic growth	Bidirectional between the M2 to GDP ratio and GDP per capita growth.
Helmi Hamdi, Rashid Sbia and Bedri Tas	2012	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE	1980	2010	The ADF unit root test, the panel unit root tests developed by Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003), and Breitung (2000), and a modified version of the Granger causality test	There is a relationship between financial development and economic growth	The findings show a bidirectional relationship between the two variables
Hatim Ameer Mahran	2012	Saudi Arabia	1968	2010	The ARDL model to test for cointegration, the OLS regressions, the ECM, and the ADF unit root test	The results show the presence of a long-term negative relationship between banking sector development and economic growth	Not tested in this paper
Shigeki Ono	2012	Russia	Q2 1999	Q2 2008	The Phillips-Perron test, the Johansen test, and the VECM	There is a long-term relationship between financial development and economic growth	The relationship is bidirectional as money supply stimulates economic growth while economic growth encourages bank lending
Osuji Casmir Chinaemerem and E. E. Chigbu	2012	Nigeria	1960	2008	The ADF test, the Johansen cointegration technique, and the Granger Causality test	A long-term relationship exists between financial development and economic growth in Nigeria	The causal relationship between financial development and economic growth is bidirectional
Adolfo Barajas, Ralph Chami, and Seyed Reza Yousefi	2013b	146 countries	1975	2005	The GMM dynamic panel method	There is a relationship between the banking sector depth and economic growth. For the same level of banking depth, the MENA region	Not covered by the paper

						produces growth effects that are one-third smaller than other regions. The benefit of the financial deepening is weaker in oil-exporting countries in comparison to other countries	
Serhan Cevik and Mohammad Rahmati	2013	Libya	1970	2010	The ADF test, then the Johansen procedure, the VECM (a restricted form of the VAR model) and the OLS regression models	There is no relationship between finance and growth in the case of Libya	Finance and growth are independent
Fakhri Hasanov and Fariz Huseynov	2013	Azerbaijan	2000	2009	The ARDL bounds testing approach, the Engle-Granger approach, the Johansen approach, the ADF, and Phillips-Perron unit root test	There exist short- and long-term relationships between banking sector development and non-oil economic growth in Azerbaijan	The causality runs from bank credit to growth
Nahla Samargandi, Jan Fidrmuc and Sugata Ghosh	2013	Saudi Arabia	1968	2010	The ARDL to test for cointegration, and the ECM	The relationship is negative and insignificant between the financial development and the overall economic growth. The relationship is positive between financial development and growth in the non-oil sector	Not investigated
Manizheh Falahaty and Law Siong Hook	2013	Egypt, Iran, Jordan, Kuwait, Malta, Morocco, Oman, Saudi Arabia, and Tunisia	1991	2009	The ADF test, the cointegration test presented by Pedroni (1999) the FMOLS, and the Dynamic Ordinary Least Squares (DOLS)	A positive relationship exists between stock market development and economic growth. The relationship between banking sector development and economic growth is negative	Not considered by the paper
Christian Hattendorff	2013	Up to 110 countries	1970	2007	Cross-sectional OLS regressions, a two stages least squares (2SLS) model, and an OLS panel model	In countries with abundant resources, financial sector is less developed and accordingly contributes less to economic growth	Not covered by the paper
Mohamed Abbas Ibrahim	2013	Saudi Arabia	1990	2008	The FMOLS and the ADF test	Banking sector development is positively associated with economic growth in the long-term whereas the stock market development is negatively related to growth and insignificant	Not covered by the paper

The number of studies conducted in the area of financial development and economic growth for resource-based economies has been increasing over the years. This trend is particularly evident over the last three years where the publication frequency increased from three studies in 2011 to seven studies in 2013. The upward trend in the number of publications concerned with the banking-growth nexus in the NRBC demonstrates the growing interest in this area of research. Figure 3 shows the number of research papers published per year.

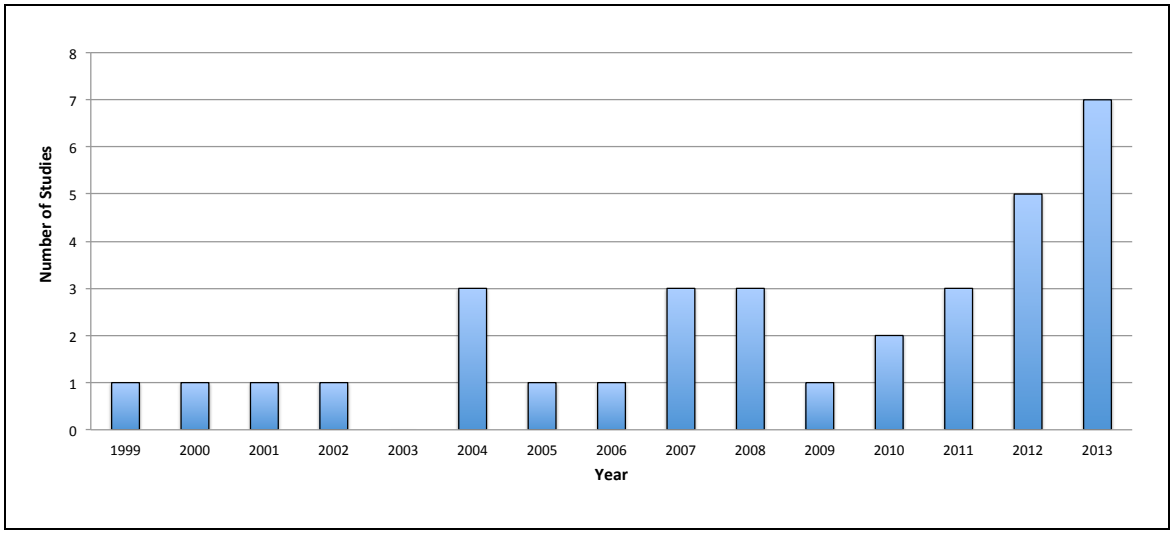

Figure 3. Number of study publications per year

Despite the policy and practical implications, discussions as well as policy recommendations of a number of papers included in the SLR, the examination of the literature type reveals that all 33 publications are academic studies. More specifically, 22 research studies are published as journal articles, nine as working papers, and two as conference proceedings (see Figure 4).

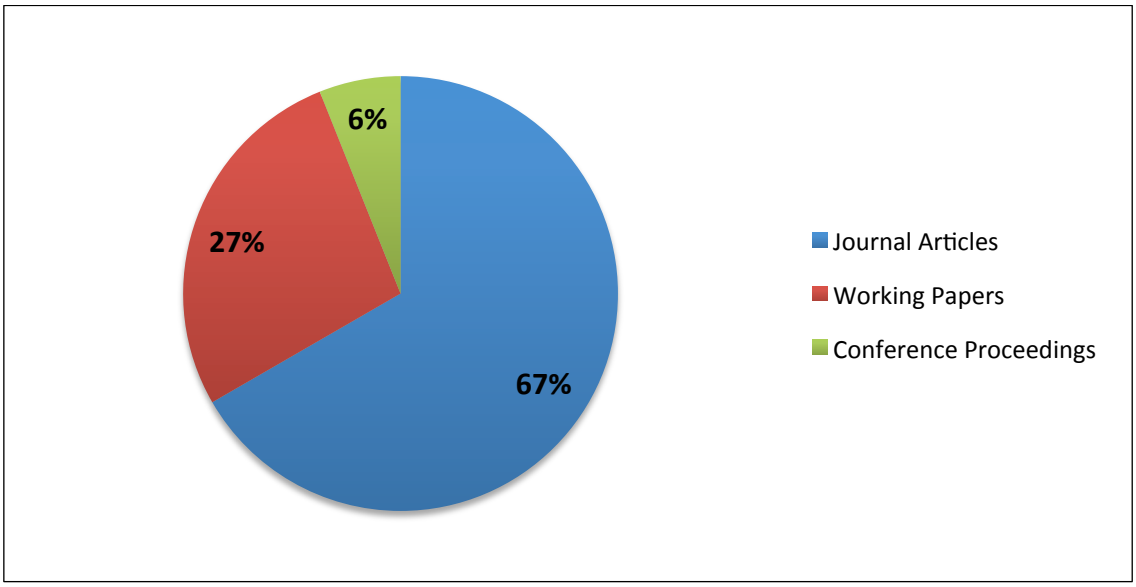

Figure 4. Type of publications in which the studies are published

In terms of the journals, working papers, and conference proceedings in which the included studies are published, the IMF Working Paper series and the Applied Econometrics and International Development journals are the top two publications in which 15% of all the studies are published. As Table 13 shows, the other studies are scattered across various journals, working papers, and conference proceedings.

Table 13: Top publications in which the studies are published

Name of the Publication	*Number of Studies*	*Percentage of All Studies included*
IMF Working Paper	3	9%
Applied Econometrics & Int. Dev.	2	6%
Other Publications	1 each (28 Studies)	85%

The topic themes of the selected studies are summarised in Table 14. Research studies directly considering the relationship between financial development and economic growth account for 85% of all the studies included in the review related to the first question. This is followed by studies investigating the relationship between natural resources and economic growth.

Table 14: Study themes of the research studies

Study Theme	*Number of Studies*	*Percentage of All Studies included*
Financial development & economic growth relationship	30	88%
Natural resource & economic growth relationship	2	6%
Investment & economic growth relationship	1	3%
Finance-growth nexus with focus on Islamic Banking	1	3%

All the studies reviewed solely employ quantitative methods to address their research questions and hypotheses. Gylfason and Zoega (2002) and Bhattacharyya and Hodler (2010) are the only exceptions, as these authors base their research on theoretical as well as empirical models.

Table 15: Countries covered in more than 10% of the studies

Country Name	*Number of Studies Considering the Country*	*Percentage of All Studies included*
Saudi Arabia	16	48%
Algeria	12	36%
Egypt	12	36%
Kuwait	12	36%
Bahrain	11	33%
Jordan	11	33%
Morocco	10	30%
Iran	9	27%
Oman	8	24%
UAE	8	24%
Tunisia	8	24%
Sudan	7	21%
Syria	7	21%
Turkey	7	21%
Qatar	6	18%
Nigeria	4	12%

Table 15 presents the countries that are included in more than 10% of the review studies. The figures show that Saudi Arabia is researched by nearly half of the studies while Algeria, Egypt and Kuwait are present in 36% of the studies included in the review. Furthermore, the table suggests that the GCC States are covered by at least 18% of the studies.

Table 16: Top 10 studies in terms of data sample length

Author(s)	*Year of Publication*	*Length of Data Sample (in Years)*
Bhattacharyya & Hodler	2010	100
Chinaemerem & Chigbu	2012	48
Al-Tamimi, Al-Awad & Charif	2001	47
Beck	2011	47
Goaied & Sassi	2011	44
Abu-Bader & Abu-Qarn	2008	44
Boulila & Trabelsi	2004	42
Mahran	2012	42
Samargandi, Fidrmuc & Ghosh	2013	42
Gylfason	2004	42
Average of All 33 Studies		34.63

In terms of the data employed by the scholars, all the selected studies use country-level data. The average length of the data sample of the 33 studies is 34.63 years (see Table 16). The longest data sample of 100 years is employed by Bhattacharyya and Hodler (2010) while the shortest of nine years are used by Ono (2012) and Hasanov and Huseynov (2013). The latter two studies, however, utilise quarterly data making the length of the time series 32 for each study.

4.1.2.2 A Critical Review of the Findings

This section critically reviews the studies and discusses their findings. In doing so, the studies are categorised according to their results. First, the research papers reporting a positive relationship between banking sector development and economic growth are examined. Here the studies supporting the supply-leading hypothesis are grouped together while those with findings that are in line with the demand-following theory are clustered together. The studies with findings suggesting a bidirectional relationship between banking development and economic growth as well as the research articles that conclude mixed causality results between the two variables are reviewed in separate groups. The second part of this section discusses the studies that find a negative relationship between financial development and economic growth. Finally, the papers

that report no relationship between banking development and economic growth are considered. Figure 5 groups the reviewed papers according to their findings.

4.1.2.2.1 Financial Development & Economic Growth are Positively Associated

A number of the reviewed studies find a positive relationship between banking sector development and economic growth. In their paper, which explores the relationship between natural resources and economic growth through the saving and investment channel, Gylfason and Zoega claim that "natural resource abundance may … under certain conditions … retard the development of financial institutions in particular and hence hamper saving, investment and economic growth through that channel as well" (2002, p.2).

Their study is based on theoretical models—such as the Cobb-Douglas, Solow, and Ramsey models—as well as regression analyses that investigate the direct and indirect relationship between natural capital and economic growth. The findings of the cross-country regression models suggest that an increase of between 8% and 9% in natural capital leads to a decline of 1% in economic growth. In addition, the OLS results illustrate that financial depth accounts for about 8% of the natural capital effect on economic growth. Gylfason and Zoega (2002) accordingly conclude that financial development promotes economic growth. Despite the study being based on theoretical as well as empirical models, the authors employ simple econometrics models to investigate the relationships between the variables. More advanced quantitative models are required to validate and confirm the results.

Figure 5. Summary of the Reviewed Studies' Findings

Similarly, Gylfason (2004) assesses the relationship between natural resource dependence and economic growth. The paper aims to highlight the crowding out effect of the natural capital intensity on foreign capital, social capital, human capital, and financial capital that in turn hinder economic growth. Using data from 105 countries between 1960 and 2002, he runs cross-country regression models to examine the

relationship between natural capital intensity and an intermediary variable, on the one hand, and the intermediary variable and economic growth, on the other. The paper shows that natural capital is negatively associated with foreign trade and investment, political liberties, education, and financial development. This is while findings indicate that the intermediary variables are positively related to economic growth. Although Gylfason (2004) is not focused on investigating the finance-growth nexus, the paper contributes to the natural recourse curse literature by emphasising the channels by which natural resources effect economic growth—including the financial development channel.

Another study that employs cross-country data is that of Bhattacharyya and Hodler (2010). The paper investigates the relationship between natural resource revenues and financial development theoretically and empirically. They argue that natural resource revenues hinder financial development in countries with poor political institutions, but not in countries with comparatively better political institutions. To assess the relationship between natural resource revenues and financial development, the paper adopts the panel data analysis. The empirical findings illustrate that resource rents are negatively associated with financial development in countries that have weak political institutions, but not in countries with comparatively stronger political institutions. The paper concludes that in resource-rich economies, the strong and democratic political institutions foster financial development. The research adds to the debate around the effect of natural resources on financial development and the relationship between financial development and economic growth in resource-rich countries by introducing the political institutions dimension. This opens the doors for further research that takes into account the effect of the political institutions and settings in the resource-based economies on the finance-growth nexus.

In comparison with the other papers discussed thus far in this section, Beck (2011) solely examines the finance-growth relationship in the resource-based economies. His intention is to identify whether there is a resource curse in financial development. Beck investigates the relationship between financial development and economic growth in natural resource-based economies using Barro-style standard cross-country regressions.

The paper runs the models employing alternative measures of financial development and natural resources. To assess the significance of financial deepening for the industries that depend on external finance for growth in the resource-based economies, the paper uses a model that is based on the work of Rajan and Zingales (1998) where growth is regressed on the industry-level measure of external dependence, financial development measures, and natural resources measures. Beck also included bank-level data in regression models to examine the structure, profitability, efficiency, and stability of the financial sector in the resource-rich countries. Finally, Beck (2011) explores whether there are differences in firm's financing patterns and financing obstacles in the natural resource-based economies.

The results of Beck's (2011) study illustrate that there is no significant difference in the relationship between financial development and economic growth in the natural resource-based economies in comparison with other countries. Financial deepening, however, is less income-elastic, the banking sectors are smaller, and the stock markets are less liquid in the resource-rich countries relative to the other countries. In addition, the results show that the resource-based countries' banks are more liquid, more profitable, and better capitalised relative to other countries but have the same business model. The banks also lend relatively fewer loans to the real economy. The results of Beck's model that utilises the firm-level data suggest that firms in the natural resource countries rely less on external finance to fund their working capital and fixed assets investments. They are less likely to have loans. The evidence points to potential finance supply constraints, as there is no lack of demand in those countries.

Beck (2011) concludes that financial development is positively associated with long-term economic growth. The paper contributes to the literature by being the first to investigate in depth the finance-growth nexus in the context of the resource-based economies. He employs various data, variables and models to answer more than one question in this paper. The focus of the study could be improved by dividing it into a number of papers, each focusing on and exploring one question.

Hattendorff (2013) investigates whether growth in resource-rich economies might be mitigated as a result of lower financial development caused by lower external credit demand. The paper contends that the negative relationship between resource-abundance and financial development is explained by the economy's demand for credit. This argument contradicts Beck's (2011) findings that there is no lack of demand for credit in the resource-based economies but potential finance supply constraints. Hattendorff supports his claim with the results of cross-sectional OLS and 2SLS regression models that employ the data for 110 countries between 1970 and 2007. The results of the cross-sectional OLS suggest that the relationship between financial development and resource abundance is negative. However, findings associated with the 2SLS regression models show that the external finance need of exports as a proxy of the aggregate demand for credit is positively associated with financial development.

An additional paper that employs cross-country data and reports a relationship between banking sector development and economic growth is that of Barajas et al. (2013b). The paper, however, concentrates on the finance-growth nexus in the context of the MENA region and assesses whether the effect of financial deepening on economic growth differs across regions, income levels, and type of economy. To test their hypotheses, the authors employ the GMM dynamic panel method. The GMM dynamic panel method is selected to overcome the issues associated with the OLS estimators of omitted variables and the reverse causality.

The paper finds that for the same level of banking depth, the MENA region produces growth effects that are one-third smaller than other regions. The effects on the total economic growth are even weaker for non-oil growth with the impact being about half of that for the rest of the world. The results, however, suggest that the GCC behaves similarly to the high-income countries. Further, the oil exporting countries benefit less from financial deepening while low-income countries (LICs) obtain lower growth benefit than other countries with the same level of banking depth. The authors explain the lack effectiveness of the banking sector in the MENA to the low access to finance and competition, the state ownership of banks, and the lack of demand for credit.

To date, this paper is the only one that investigates the relationship between finance and economic growth in the MENA region and compares it to the rest of the world. Barajas et al. (2013b) fail to support their claim that the underperformance of the MENA region is explained by a "quality gap" in financial intermediation and is related to the ownership structure, competition and slow financial reforms by evidence in this paper or from other papers in the literature.

Barajas et al.'s (2013b) results confirm the earlier findings of Al-Zubi et al. (2006) and Barakat and Waller (2010) that a positive relationship exists between the development of the financial intermediaries and economic growth in the MENA region. Al-Zubi et al. (2006) examine the relationship using country-level data of Algeria, Bahrain, Egypt, Jordan, Kuwait, Morocco, Oman, Saudi Arabia, Sudan, Syria and Tunisia for the period from 1989 to 2001. Their paper utilises three different panel regression models in which the economic growth measure is regressed on a set of financial development measures and the controlling variables. The three models are the OLS model, the FEM, and the REM. Unlike the results of the other research, their paper shows that the credit to public sector as a percentage of GDP is the only statistically significant measure of financial development. It contends that the results reflect the dominance of the public sector on the economic activities and the financial sector's high exposure to government and State-owned enterprises.

Barakat and Waller (2010) assess the relationship between financial development and economic growth in the Middle Eastern countries by considering variables for financial intermediaries as well as financial markets. Exploiting the multivariate regression models, the authors show that economic growth is not significantly associated with the financial market measures. Economic growth is, however, positively related to the bank credit at the 1% significant level. The results also indicate that the influence of the banking sector development on economic growth is larger in the GCC region than in the other MENA countries. Despite its emphasis on the country-specific factors in determining the finance-growth relationship and its use of dummy variables to evaluate the differences in the relationship among the GCC countries and the rest of the Middle

Eastern states, the paper fails to link or discuss the different characteristics of the researched countries in association with the results.

Ibrahim (2013) investigates the finance-growth relationship in Saudi Arabia and reports a positive link between the banking sector development and long-term economic growth. The author includes development measures of the banking sector as well as the stock markets and employs the FMOLS method to achieve optimal estimates of the cointegration regression. The results illustrate that the bank credit to the private sector is statistically significant and positively associated with economic growth in the long-term but insignificant and negatively related to growth in the short-term. The relationship between the stock market index and economic growth is positive both in the long- and the short-term but is insignificant.

Ibrahim argues that the paper "tries to fill the theoretical and empirical gaps created by the different economic school of thoughts related to the impact of financial development on economic growth for Saudi Arabia" (2013, p.137). In spite of his broad knowledge of both the empirical and theoretical literature on the topic, the last statement shows that the author overlooks the other studies which consider the finance-growth nexus in the context of Saudi Arabia (Darrat, 1999; Masih et al., 2009).

4.1.2.2.2 Positive Relationship with Causality Running from Finance to Growth

All of the papers discussed in this section find a positive link between the development of the banking sector and economic growth. Those papers, however, do not consider the direction of causality between the two variables. A number of studies that consider the relationship in the natural resources economies in general and the GCC countries in particular find evidence that supports the supply-leading hypothesis which suggests that the creation of financial institutions and their supply of assets, liabilities and other financial services in advance of the demand then promotes economic growth (Patrick, 1966).

Abu-Bader and Abu-Qarn (2006) examine the causal relationship between financial development and economic growth for six MENA countries. Out of the six countries studied, Algeria and Syria are considered to be resource-based economies. The Granger

causality test is employed to study whether two or more variables share a common trend (i.e. cointegrated) while the VECM is used to detect the direction of causality between the banking sector development measures and the real GDP per capita. The paper finds that out of the six countries studied, five (including Algeria and Syria) exhibited causality running from banking sector development to economic growth in at least one measure of financial development. Further, the findings show financial development indirectly stimulates economic growth by enhancing investment both in Algeria and Egypt.

The use of time series analysis, as opposed to cross-section analysis, enables the authors to overcome some of the pitfalls associated with the latter, including disregarding the country-specific factors and the inability to capture the short-term and the long-term relationship between financial development and economic growth in each country. The use of time series analysis limits the number of countries included in the study as long time series data are required to infer the long-term relationship between finance and growth.

Masih et al.'s (2009) study is another that is based on time series analysis. Their study investigates the direction of causality between development of the banking industry and economic growth in Saudi Arabia. It employs the VECM, variance decomposition approach, and the Johansen cointegration test. The latter test is combined with the LRSM technique for investigating cointegration between the variables. This is while the VECM is included to test the short- and the long-term direction of causality, and variance decomposition is exploited to discern the relative degree of endogeneity or exogeneity of the variables.

The Johansen test and the LRSM technique indicate that all the tested variables are cointegrated. The VECM results show that the economic growth tends to respond to the banking sector development. The variance decomposition approach illustrates that the banking sector development measure is the most exogenous of all the variables and explains 35% of the variance in economic growth, whereas economic growth only explains 11% in the variation in banking sector development. Masih et al. (2009) argue

that they are the first to employ the VECM, the variance decomposition and the improved cointegration methods for investigating the relationship in the region. Their paper, however, approximates financial development with the bank deposits to GDP ratio. The ratio does not capture the level of development of the banking sector as it reflects only one part of the intermediation process. The model can be improved by including another measure that can capture the level of the lending activities relative to the size of the Saudi economy.

Baliamoune-Lutz (2008) includes the ratio of bank claims on the domestic non-financial real sector to the sum of banks and Central Bank claims on the domestic non-financial real sector, bank assets to GDP, liquid liabilities to GDP, and credit to the private sector to GDP, as measures of banking sector development in her study of the relationship in Algeria, Egypt and Morocco. She utilised the data from 1960 to 2001 for those countries along with the cointegration test, the VECM, and the Granger causality test to explore the short-term dynamics and long-term relationship between banking sector development and income.

The Johansen cointegration test results suggest that all the banking sector development variables are cointegrated with income with the exception of credit to the private sector measure in Algeria. The liquidity ratio is positively associated with income in all three countries but credit to the private sector measures have a negative relationship with income in Egypt and Morocco. In addition, the paper illustrates that a positive long-term relationship between banking sector development and income using the different measures is only present in the case of Algeria. Even though the study is limited to three countries, its results are significant for the literature as they illustrate that finance-growth relationships can differ even across countries with similar per capita income levels and within the same region.

Evidence supporting the positive finance-growth relationship in the resource-rich economies is also found in papers considering non-MENA countries. Hasanov and Huseynov (2013) examine the impact of bank credit on non-oil tradable sector output in Azerbaijan. They ask the following question “Do bank credits stimulate growth in [the]

non-oil tradable sector in a resource-based small open transition economy?" (2013, p.598). In contrast to the other research in this area that generally employs annualised data, the paper uses quarterly data for the period between 2000 and 2009. Hasanov and Huseynov include three cointegration methods and illustrate that there is a significant long- and short-term association between bank credit and the non-oil tradable sector's outcome. In the long run, the paper shows that an increase of 1% in the bank's credit results in economic growth of between 0.30% and 0.40%. This is while in the short-term, between 80% and 90% of the disequilibrium in the non-oil tradable output growth of the previous quarter adjusts to its long-term equilibrium within one quarter.

The authors suggest that their paper fills a gap between the literature on transition and resource-based economies. The paper also contributes to the literature by employing the ARDL bounds testing approach for investigating cointegration between bank credit and non-oil output for the first time, as well as using the most recent data from Azerbaijan. Despite the use of quarterly time series, the number of years utilised in this research is only 10. Further investigation into the relationship as more data become available is thus required to confirm the findings.

4.1.2.2.3 Positive Relationship with Growth leading Finance

Research studies that find evidence in favour of the demand-following theory in resource-rich economies include Kar et al. (2011). According to Patrick, the demand-following theory contends that "the creation of modern financial institutions, their financial assets and liabilities, and related financial services is in response to the demand for those services by investors and savers in the real economy" (1966, p.174).

Kar et al. (2011) study the direction of causality between banking sector development and economic growth in 15 MENA countries. The study includes nine countries that are considered to be resource-based economies: Algeria, Bahrain, Iran, Kuwait, Libya, Qatar, Saudi Arabia, Sudan, and Syria. Kar et al. employ the SUR and Wald tests to assess the direction of causality between financial development and economic growth. The SUR is used as it allows for cross-sectional dependency as well as heterogeneity. The authors select the Wald test as it provides the critical values for each country enabling them to examine the direction of causality for each country independently.

The findings associated with the resource-based economies show that causality runs from economic growth to financial development when credit to the private sector as a percentage of GDP is used as a proxy for the banking sector development. The findings related to the other measures of financial development provide mixed results. Kar et al. (2011) conclude that overall the results do not support the notion that the development of the financial sector promotes economic growth in the MENA region. The findings in general lend support to the demand-following hypothesis in the case of the resource-based economies.

Kar et al. (2011) argue that the paper contributes to the empirical literature on financial development and economic growth by introducing a novel panel causality approach that controls for dependency across the members, examining six financial development measures, and employing a long period of data for 15 countries in the MENA region. The study, nevertheless, can be expanded to discuss possible similarities among the countries with common findings with respect to the direction of causality.

4.1.2.2.4 Positive Relationship with Bidirectional Causality

There are a number of studies that support both the supply-leading and the demand-following hypotheses. Chuah and Thai's (2004) study is one of the earliest to indicate bidirectional causal relationships between banking sector development and income in the GCC countries. The paper utilises the ECM, VAR model, and the Granger causality test to assess the direction of causality. The results of the tests for each GCC country indicate bidirectional relationships in five of the six member countries and finance leading growth in Qatar.

Chuah and Thai (2004) suggest that the bidirectional causal relationships in Bahrain, Oman and Saudi Arabia reflect the importance of the liquidity generated from the hydrocarbon exports for the development of the financial sector through the establishment of institutions and markets. The institutions and markets channel liquidity to the real sector through investment, which in turn stimulates economic growth. The increase in income levels also results in higher demand for financial services causing further development in the financial sector. In the case of Kuwait, Chuah and Thai

(2004) explain that the government policy to encourage investments promoted the development of the financial sector through the increased use of credit to the private sector. The development of the banking sector in return improved the level of financial services offered, promoting further investment and so growth. This is while the development of the non-hydrocarbon sectors in the UAE attracted the development of liquid liabilities. In turn, the financial sector and the banks in particular channelled the funds to the private sector through lending, which echoes government policy to promote investment for higher economic growth.

However, the paper fails to explain the finance leading growth in Qatar and suggests that the result is associated with shortcomings in the data. The results suggest that further research is required to understand the bidirectional relationship that dominates most of the region and to assess the strength of the relationship between finance and growth.

Similarly to Chuah and Thai, Hamdi et al. (2012) find bidirectional relationships between the development of the banking sector and economic growth in the GCC region. For testing causality, the paper uses the Toda and Yamamoto (1995) technique. The latter is a modified version of the Granger causality test and has the advantage of improving the power of the standard Granger causality test while it does not require knowledge of the cointegration properties of the model. Hamdi et al. (2012) find three bidirectional relationships. The first is between M2 to GDP and investment to GDP ratios, the second is between M2 to GDP and economic growth, and the third is credit to the private sector to GDP and economic growth. The paper adds value to this research area by solely focusing on the GCC region and employing the most recent data to draw conclusions on the finance-growth relationship.

Two papers that report similar findings for non-GCC countries are those of Ono (2012) and Chinaemerem and Chigbu (2012). Ono investigates the link between financial development and economic growth in Russia during its rapid growth period. Employing quarterly data for the period between 1999 and 2008, he uses cointegration tests along with the VECM model to determine the direction of causality. The unit root test results

show that all variables are integrated at the first difference. The causality test results for the first model show that the money supply affects economic growth, whereas the results for the second model illustrate that economic growth impacts on lending activities.

Ono (2012) argues that the contradictory results reflect the characteristics of the Russian economy. He contends that the high oil prices and private capital inflows on the one hand, lead to the appreciation of the Russian ruble that in turn increases the money supply due to the lack of sterilisation instruments. Subsequently this increase in the money supply would stimulate economic growth. On the other hand, the acceleration in economic growth encourages banks to increase their supply of credit. He concludes that the relationship is bidirectional in the case of Russia.

Chinaemerem and Chigbu (2012) consider the case of Nigeria. The authors examine the effect of financial development on economic growth using data for the period between 1960 and 2008 along with the unit root test, cointegration test and Granger Causality test. The results suggest that a stable long-term relationship exists between the dependent variable (GDP) and the independent variables (money supply and credit to the private sector). The findings of the causality test indicate a bidirectional relationship between GDP and money supply, on the one hand, and between GDP and credit to the private sector on the other. Despite its contribution to the development of the literature by providing evidence from Nigeria, the study fails to discuss the financial sector and its development during the studied period. In addition, the paper could be improved by including a discussion section that considers the results and their implications for policy in Nigeria.

4.1.2.2.5 Positive Relationship with Mixed Causality Results

Unlike the research papers that find bidirectional causality relationships between financial development and economic growth, a number of papers report mixed results where different causal relationships are found for each of the countries studied. Papers included in this category are Darrat (1999), Al-Tamimi et al. (2001), Boulila and Trabelsi (2004), Al-Awad and Harb (2005), and Eltony and Al-Mutairi (2000).

Darrat (1999) empirically enquires into the role of financial deepening in the economic growth of Saudi Arabia, Turkey and the UAE. He conducts three unit root tests: the Johansen-Juselius approach to assess whether the financial deepening measures, economic growth, and the inflation rate are cointegrated or not, and the ECMs to analyse the long-term causal relationship between the variables.

The unit root and cointegration tests show that the variables are stationary at first difference (with the exception of the ratio of broad money stock to nominal GDP in Saudi Arabia which is stationary in second differences) and are cointegrated. The ECM results illustrate that the deepening of the financial sector affects economic growth in the short-term for Turkey and the UAE. The same causal relationship exists in the long-term for the case of Turkey. The long-term evidence for Saudi Arabia and the UAE is not as strong or unambiguous. In the Saudi case, the long-term relationship is bidirectional. For the UAE, however, the relationship runs from economic growth to financial deepening. Accordingly, Darrat (1999) contributes to the literature by highlighting the differences in nature of the relationships between the three countries he studied.

Al-Tamimi et al. (2001) consider the causal relationship between financial development and economic growth in eight Arab countries. They include the resource-based economies of Algeria, Bahrain, Kuwait, Saudi Arabia, and Syria. The paper tests for non-stationarity of the data using the Augmented Dickey-Fuller test, assesses the cointegration and causality with the Johansen and Granger procedures, and employs the impulse response function to identify the effects of the financial development on economic growth.

The study finds a long-term relationship between financial development and economic growth in Algeria, Egypt, Kuwait, Morocco, and Saudi Arabia. It also finds that causality exists at least in one direction for Bahrain, Egypt, Kuwait and Morocco. In the first three countries, the financial development causes economic growth. This is while economic growth drives financial development in Morocco. The impulse response

functions suggest that a shock to real GDP induces a significant response to financial development in Bahrain and Morocco only. Al-Tamimi et al. (2001) conclude that the Granger tests and the impulse response functions results provide evidence of a weak short-term association between finance and growth in those countries. The research has the advantage of conducting a number of tests to investigate the relationship. It fails, however, to provide details of the financial structure and development of each country studied. In the light of the mixed results, this could provide a better understanding of the different finance-growth relationships among countries.

Another regional study that reports mixed findings is that of Boulila and Trabelsi (2004). The authors employ the Granger Causality test technique to examine the direction of causality between finance and growth in 16 MENA countries. The study finds evidence supporting the view that economic growth causes financial development in Oman, Syria, and Sudan. This is while, in the cases of Bahrain, Qatar, and the UAE, the causality is bidirectional. The evidence from Egypt, Mauritania, and Turkey suggests that financial development promotes economic growth. There is no evidence of causal relationships in the cases of Iran, Jordan, Kuwait, Morocco, Saudi Arabia, Sudan and Syria.

Boulila and Trabelsi (2004) offer policy recommendations that call for reform and the liberalisation of the financial sector. They argue that the financial sector development must take priority in the MENA region to stimulate economic growth, despite the mixed findings of their study. They do not base their policy recommendations on any theoretical or empirical studies. Suggesting specific policies for each country or group of countries with similar financial development and economic growth relationships could be more valuable.

As in the case of Boulila and Trabelsi (2004), Al-Awad and Harb (2005) consider the link between banking sector development and income in the MENA region. In doing so, the authors exploit the panel cointegration method developed by Pedroni (2004), the panel FMOLS estimator by Pedroni (2001), and the Granger causality test, to investigate cointegration and the direction of causality at the group level. Their paper

also analyses the variance decompositions of real GDP and the financial development indicator to assess the strength of the causality evidence.

At the panel level, the paper finds evidence of a long-term relationship between financial development and economic growth, and causality running from growth to finance. At the individual country level, the findings suggest a bidirectional relationship between financial development and economic growth in Syria and Morocco, one-way causality running from finance to growth in Algeria, Egypt, Saudi Arabia and Tunisia, and one-way causality running from growth to finance in Jordan and Turkey. This is while there is no evidence of causality for Iran and Kuwait. Al-Awad and Harb (2005) contribute to the literature in this paper by assessing the relationship both at the panel level as well as the individual country level. The results, however, are based on one measure of financial development (i.e. private credit to monetary base ratio). Examining more than one financial development indicator might lead to different results.

Finally, Eltony and Al-Mutairi (2000) investigate the relationship between financial deepening and economic growth in Kuwait and find mixed results. The data sample included in the study covers the period from 1975 to 1999 while the measures used to proximate the level of banking sector development are the ratio of currency in circulation to the narrow money supply M1, ratio of the broad money supply M2 to GDP, and ratio of the narrow money supply to GDP. The authors employ the augmented Dickey-Fuller unit root test, the Engle and Granger cointegration test, and the ECM to examine the direction of causality. The results indicate that all the variables are stationary at the first difference and are cointegrated. Furthermore, the ECM findings suggest that financial deepening, measured by the monetisation ratio and the mobilising longer-term assets, promotes short-term as well as long-term economic growth. This is while the results associated with the currency ratio indicate that economic growth results in financial deepening. Thus the results support both the supply-leading and the demand-following hypotheses.

4.1.2.2.6 Financial Development & Economic Growth are Negatively Linked

In contrast to the papers discussed earlier in this section, which demonstrate that a positive relationship exists between the banking sector development and economic

growth, a number of studies (discussed below) find a negative relationship between the two variables.

One study is that of Nili and Rastad (2007). It examines whether the low level of financial development in the oil exporting countries is related to the weak investment–growth relationship in these countries relative to that of the non-oil economies. In addition, the study investigates the effect of financial development on investments in the oil exporting countries The authors employ the GMM regression method along with data for 144 countries for the period from 1960 to 2001 to test the hypotheses.

The findings show that the relationship between financial development and investment is significantly weaker in oil economies when it is controlled for dependence on oil. Further, the results suggest that financial development has a dampening effect on investments in oil exporting countries. The interaction between financial intermediation development and investment is negatively associated with economic growth in economies highly dependent on oil. Nili and Rastad (2007) argue that their paper provides an explanation of the puzzle of high investment rate and low economic growth in oil dependent countries. Their paper does not, however, report the relationship between investment and economic growth in oil and non-oil dependent countries to assess the dampening effect of financial intermediation.

Ben Naceur and Ghazouani (2007) focus on the MENA region and test whether the banking sector and stock market development each have a positive impact on economic growth. The authors use a dynamic panel model based on the GMM method where real GDP per capita is set as the dependent variable in a number of regressions that include the banking sector development proxies, stock market measures, and controlling variables. The empirical results associated with the model that include all 11 MENA countries as well as the one that only includes the oil exporting countries show that the banking sector indicators are always negatively linked to economic growth while the stock market measures are insignificant.

Ben Naceur and Ghazouani (2007) argue that the insignificant and negative association between the financial sector development indicators and economic growth seems to be related to the public sector dominance over the banking sector, weak credit regulations, and uncompetitive banking sectors. They also link the results to financial repression and the underdevelopment of the stock markets in the MENA region. The authors, nonetheless, do not support their claims about the characteristics of the banking sector and stock markets in the MENA region by providing data or referring to the literature.

Goaied and Sassi (2011) also find a negative relationship between banking sector development and economic growth. As in the previous regional studies, the paper utilises the GMM procedure to investigate the relationship in the MENA region but with a specific focus on Islamic banking. The authors employ the data for 15 countries in a regression model that regresses economic growth on commercial banks' credit to the private sector, Islamic banks' credit to the private sector, and a number of conditioning variables. Further, the same model is estimated for two sub-samples. The first is for the oil-exporting countries, the second for the non-oil exporting countries.

The findings associated with the first model show that the banking sector development and economic growth are unrelated when using the liquid liability M3 to GDP measure. This is while the relationship is negative and significant at the 1% level when credit to the private sector is employed. Goaied and Sassi argue that their findings reflect "the high degree of financial repression in the MENA region" (2011, p.118). The findings associated with the models of the sub-samples show that the banking sector development and economic growth are negative for the oil exporting countries at 5% significance levels for both financial development measures. In contrast, the relationship is positive and significant at the 10% levels for the non-oil exporting countries. The paper contributes to the literature by assessing the relationship in the MENA region through examining the relationship for different country groups.

Considering the development of both financial intermediations and markets, Falahaty and Hook (2013) studied the relationship for nine MENA countries between 1991 and 2000. They claim that the banking sector in the MENA region suffers from a lack of

credit allocation process and regulations while it is dominated by the State. After conducting the unit root tests and cointegration tests for the variables, the authors estimate the relationship between financial development and economic growth using the FMOLS and the DOLS. Their paper estimates the models by using an equation that uses the real GDP per capita and another one that employs the non-oil GDP per capita.

The unit root tests show that the variables are integrated of order one while the cointegration analyses indicate that there is a long-term relationship between income and financial development. The FMOLS estimates reveal positive and statistically significant relationships between stock market development and economic growth; however, the relationship between the banking sector measures and economic growth is negative with the exception of the liquid liability indicator. The FMOLS results associated with the non-oil GDP equation show that the relationships between the banking sector development measures and economic growth are negative while the stock market variables are statistically insignificant. The authors argue that the findings are different from those of the literature as they highlight the significance of the stock market development in promoting economic growth. The results are also supported by the DOLS model findings.

A number of country level studies also suggest a negative association between the development of the banking sector and income. Al-Malkawi et al. (2012) provide evidence of a negative relationship in the UAE. Their paper employs data for the period from 1974 to 2008 and adopts the ARDL approach for testing cointegration developed by Pesaran and Shin (1996), Pesaran et al. (1996, 2001) and Pesaran (1997). The paper applies the ARDL approach to two models. The first regresses the credit to the private sector to GDP ratio and the control variables on economic growth, while the second runs the M2 to GDP ratio and the control variables against economic growth.

The results associated with the first model that uses the ratio of credit to the private sector to GDP as a measure of financial development suggests no cointegration. In the second model, the authors find the financial development measure M2 to GDP to have a significant negative impact on economic growth in the UAE. Al-Malkawi et al. (2012)

suggest that the findings reflect the ongoing transition of the financial sector in the UAE and contend that the sector requires to reach a certain level of development before becoming able to promote economic growth. They argue that the negative relationship is expected to change as the financial sector develops. Here the authors fail to support their view with theoretical and empirical studies. Despite that, the paper adds to the literature by applying the ARDL procedure for investigating the relationship in the UAE.

Similarly, Mahran (2012) applies the ARDL approach to investigate the relationship in Saudi Arabia. He includes liquid liabilities to nominal GDP ratio, broad money supply (M3) to nominal GDP ratio, and credit to the private sector to nominal GDP ratio, as measures of financial development. To test the short-term relationship, the paper runs OLS regressions to estimate the ECM equations associated with the ARDL.

The cointegration tests illustrate that capital investments, government spending, human capital and trade openness have significant positive effects on economic growth over the long-term. This is while the development of the financial sector is negatively associated with real GDP. The ECM yields give identical results for the short-term relationships between the variables. The study claims that the public sector dominance over economic activities, the institutional environment surrounding the private sector and the characteristics of the financial system, all hinder the development of the financial sector in Saudi Arabia. Mahran (2012) does not support this claim with evidence from this paper nor other prior studies in the literature.

Another study that assesses the finance-growth nexus in Saudi Arabia using the ARDL approach is that of Samargandi et al. (2013). As in the case of Mahran (2012), the authors employ the data for the period 1968-2010 and employ M3 to GDP ratio as well as the credit to the private sector as a share of GDP as financial development measures. The ARDL results indicate that trade openness is positively associated with the overall economic growth as well as with the growth of both the oil and non-oil sectors. However, the financial development has a negative but insignificant impact on economic growth. In contrast, the relationship between financial development and the

economic growth of the non-oil sector is positive and statistically significant at the 10% testing level. Samargandi et al. (2013) argue that the negative relationship between finance and growth is associated with the under-development of the Saudi banking system.

4.1.2.2.7 Negative Relationship with Mixed Causality Results

Unlike the other papers that report a negative finance-growth relationship, Soukhakian (2007) assesses the direction of causality between the two variables. His paper is aimed at examining the supply-leading and the demand-following theories in the context of Iran. The data employed are for the period between 1974 to 2004 while the models included unit root tests, cointegration tests, and the ECM.

After confirming the stationarity of the variables, Soukhakian shows that a negative long-term relationship exists between the broad money to nominal GDP measure and real per capita GDP ratio. He also finds a unidirectional causal relationship running from economic growth to financial development (using the broad money measure) and a bidirectional causal relationship between economic growth and financial development (using the domestic credit measure). Accordingly, the findings provide mixed results with respect to the direction of causality.

4.1.2.2.8 No Relationship Between Financial Development & Economic Growth

The research studies finding no link between banking sector development and economic growth in the resource-based economies are those of Mohamed (2008) and Cevik and Rahmati (2013). The former study assesses the effect of financial development on economic growth in Sudan over the period between 1970 and 2004. It also aims at measuring the impact of the formal financial sector reforms. Mohamed (2008) argues that the financial sector reforms in Sudan are expected to support the development of the sector and subsequently stimulate economic growth. To test his hypotheses, the author adopts the ARDL model proposed by Pesaran and Shin (1996) along with the unit root tests and the ECM.

The ARDL results illustrate that the variables are cointegrated. In the first version, the M3 to GDP ratio is found to be positively associated with economic growth but

statistically insignificant, whereas in the second version, credit to the private sector is negatively linked to economic growth and is statistically insignificant. Mohamed concludes that the financial development indicators do not have a direct impact on real economic growth. He states that the "findings may be attributed to the inefficient allocation of resources by banks, along with the absence of an appropriate investment climate required to foster significant private investment and promote growth in the long run, and to the poor quality of credit disbursal of the banking sector in Sudan" (2008, p.47). The paper contributes to the literature by offering new evidence from a resource-based country but could be improved by discussing the policy implications of the results in more detail.

Cevik and Rahmati (2013) consider the case of Libya and conclude that financial development and economic growth are independent. The authors investigate the relationship using unit root tests, cointegration tests, the OLS regression models and the ECMs (a restricted form of the VAR model). They find that the results differ from the estimation methodology and model specification but illustrate the lack of relationship between financial development and economic growth. The regression models show that the financial development in Libya is negatively associated with GDP growth. However, the cointegration analysis and VAR-based estimations confirm the lack of relationship between financial intermediation and output growth.

The authors conclude that the small size of the financial sector prevents the sector from performing its growth-enhancing role. In addition, they also conclude that the non-hydrocarbon economic activities primarily depend on government spending, which in turn is influenced by the hydrocarbon revenues. The paper argues that structural reforms are required to allow the financial sector to develop further and foster economic growth. The paper recommends a list of reforms and policy measures that make the Libyan financial system "more in line with the international practices" (Cevik and Rahmati, (2013, p.14). However, they fail to discuss the reforms in detail or their relevance for the Libyan economy.

4.1.2.3 Findings Synthesis

This section is aimed at synthesising the findings of the papers reviewed. In doing so, the similarities and differences in terms of the variables and empirical models used are highlighted. First, the findings of the studies with respect to whether a relationship exists between the banking sector development and economic growth are discussed. Then, the findings in terms of the direction of causality between the two variables are examined.

All studies included in the review consider the finance-growth nexus question. Out of the 33 studies, 23 (70%) report a positive relationship between financial development and economic growth whilst eight studies (24%) provide evidence of a negative relationship. Research studies suggesting that no relationship exists between financial development and economic growth are limited to two studies.

Studies reporting a positive association between financial development and income employ regression and time series analyses. Out of the nine studies utilising regression models, six papers use OLS and cross-country regression models, whereas the studies that are based on time series analyses confirm the relationship between banking sector development and economic growth using the Johansen cointegration test. In terms of the variables employed as a proxy for economic growth, GDP associated variables dominated the studies. For measuring financial development, however, more than one indicator is employed in the papers. In 14 of the 23 studies that report a positive finance-growth relationship, the authors included the liquid liabilities (aka broad money supply M2) variable. An equal number of studies also consider the banks' credit to the non-financial private sector variable. Both variables are usually employed as ratios to a broader money supply measure or the GDP indicator.

A number of studies contend that, in the natural resource-based economies, the abundance of resources has a crowding out effect on financial development (Gylfason, 2004; Gylfason & Zoega, 2002; Hattendorff, 2013). This is supported by the findings that financial deepening is lower in the resource-based economies (Beck, 2011) and that oil-exporting countries derive less growth from the financial sector development (Barajas et al., 2013b). Others argue that the effect of natural resources' abundance on

the finance-growth nexus depends on the level of political institutions' development (Bhattacharyya & Hodler, 2010). It is, however, suggested that a positive relationship between banking sector development and economic growth is only present when credit to the public sector is taken into account (Al-Zubi et al., 2006).

The eight research studies finding a negative finance-growth relationship are mainly based on the GMM and ARDL models. The GMM approach is employed by three studies and an equal number of papers derive their findings using the ARDL model. As in the case of studies reporting positive association, the liquid liabilities and the banks' credit to the non-financial private sector dominated the studies that suggest a negative relationship.

For some scholars, the negative link between financial development and economic growth is explained by the dominance of the public sector on the banking industry (Ben Naceur & Ghazouani, 2007) and the high levels of financial repression (Goaied & Sassi, 2011). However, for others it is a result of the dampening effect of the financial sector on investments in the oil-exporting countries (Nili & Rastad, 2007). In the case of individual countries, some authors argue that the negative relation reflects the ongoing financial sector transition and suggests that the relationship would turn to positive after a certain level of financial development (Al-Malkawi et al., 2012).

As stated above, only two studies report that no relationship exists between the banking sector development and economic growth. In both cases, the banks' credit to the non-financial private sector as a share of GDP is included as one of the financial development measures. In terms of the models utilised by the papers, one is based on the ARDL approach while the other uses the VECM method. One study associates the results with the small size of the banking sector as well as the dependence of the non-hydrocarbon economic activities on government spending (Cevik & Rahmati, 2013).

Unlike in the case of the finance-growth relationship, where 70% of the studies included in the review find a positive relationship, the findings of the studies with respect to the direction of causality are not dominated by a single result. From the 15 studies that

investigated the direction of causality between the banking sector development and economic growth, 27% of the studies report that the banking sector development promotes economic growth. The percentage of the studies indicating that the causal relationship runs from economic growth to the financial sector development is 7%, although the share of research papers finding a bidirectional relationship between the two variables is 33%. An equal percentage also reported mixed or no causal relationship between financial development and economic growth.

In terms of the variables employed, the studies generally use liquid liabilities and the banks' credit to the non-financial private sector to approximate the degrees of financial development and the GDP as a measure of economic growth. The models utilised, however, are more diverse. In the studies reporting causality running from the banking sector development to economic growth, 75% exploited the VECM approach. This is while 60% of the research papers finding mixed or no causal relationship employed the Granger causality testing technique. The models used by scholars reporting a bidirectional finance-growth relationship include the VECM, VAR, Granger, and a modified version of the Granger approach.

4.1.3 Evaluation of Findings

In this section, the findings of the studies included in the review are evaluated with respect to the extent to which they answer each review question. Addressing the first part of the review question that enquires into the nature of the relationship between the banking sector development and long-term economic growth in the context of the natural resource-based economies in general, 70% of the reviewed research studies' findings lend support to the notion that the banking sector development is positively associated with long-term economic growth.

The findings are in line with those of Beck (2011) whose paper is considered to be the first study that investigates the finance-growth nexus specifically in the context of the natural resource-based economies with the aim of identifying if there is a resources curse in financial development. Although all the other studies included in the review

consider the relationship in resource-based economies, only Beck (2011) examines whether the relationship differs in countries with abundant natural resources in comparison to the other countries. In addition, the paper is considered to be a comprehensive study in this area as it employs data from 153 countries for the period from 1960 to 2007 and uses empirical models that utilise country-, industry-, bank-, and firm-level data. As discussed earlier, the paper finds a positive relationship between the development of the banking sector and long-term economic growth as well as confirms that there is no significant difference in the relationship in the resource-rich economies in comparison to other countries.

In answering the review question in the context of the GCC countries particularly, the evidence from nine studies included in the review that focuses on the GCC region and member states also suggests that banking sector development and economic growth are positively linked. In six of the nine studies (66.7%), the findings indicate a positive association between the two variables.

The findings, however, are inconclusive for the GCC region as a whole for two reasons. Firstly, the number of studies included in the review that concentrate on the relationship in the GCC countries is limited to nine. Secondly, and more importantly, four studies investigate the relationship in the context of Saudi Arabia (Ibrahim, 2013; Mahran, 2012; Masih et al., 2009; Samargandi et al., 2013), one focuses on Saudi Arabia and the UAE (Darrat, 1999), one considers the relationship in the UAE solely (Al-Malkawi et al., 2012), one examines the nexus in Kuwait (Eltony & Al-Mutairi, 2000), and two study the relationship for all six GCC member countries (Chuah & Thai, 2004; Hamdi et al., 2012). The findings of four out of the nine studies are thus only relevant to Saudi Arabia, while there are no studies that consider the finance-growth nexus in Bahrain, Oman, and Qatar individually. Moreover, the studies that investigate the relationship for all the GCC countries are limited to two papers.

In terms of the direction of causality between the banking sector development and economic growth, the findings of the papers reviewed are also inconclusive. Out of the 15 studies that explored the direction of causality between the two variables, four

studies provide evidence supporting the supply-leading hypothesis (Abu-Bader & Abu-Qarn, 2008; Baliamoune-Lutz, 2008; Hasanov & Huseynov, 2013; Masih et al., 2009), one study supports the demand-following theory (Kar et al., 2011), five studies find a bidirectional relationship (Chinaemerem & Chigbu, 2012; Chuah & Thai, 2004; Darrat, 1999; Hamdi et al., 2012; Ono, 2012), and five studies show mixed results (Al-Awad & Harb, 2005; Al-Tamimi et al., 2001; Boulila & Trabelsi, 2004; Eltony & Al-Mutairi, 2000; Soukhakian, 2007).

By focusing on the direction of causality in the context of the GCC, the findings of the studies tend to lend support to the bidirectional relationship between banking sector development and economic growth. In three of the five studies (60%) that examine the direction of causality in the GCC countries, the findings provide evidence supporting both the supply-leading and the demand-following hypotheses (Chuah & Thai, 2004; Darrat, 1999; Hamdi et al., 2012). However, the other studies show that the causality runs from the banking sector development to economic growth (Masih et al., 2009), or report mixed results (Eltony & Al-Mutairi, 2000). Despite the findings associated with the GCC countries' studies appearing to point to a bidirectional relationship, the results should be treated with caution due to the limited amount of research available and the country coverage of the studies, as discussed above.

4.1.4 Discussion & Further Research

In the light of the findings of the reviewed research studies, this section discusses areas in the literature for further research.

The findings discussed above provide evidence for the presence of a positive relationship between the banking sector development and long-term economic growth in economies with abundant natural resources. But the evidence for the GCC region and countries is inconclusive and it is unclear whether the relationship differs from one GCC country to another. Accordingly, the relationship between banking sector development and economic growth in the GCC region, as well as the individual member states, needs to be further researched.

In addition, scholars investigating the relationship in the resource-based economies in general, or the GCC in particular, should consider other financial development measures. As the review above highlights, the studies in this area predominantly employ financial development proxies based on the liquid liability and the banks' credit to the non-financial private sector. One banking sector development measure that can be considered when studying the relationship is the banks' credit to the public sector. Al-Zubi et al. (2006) use the measure to reflect the structure of the studied countries in which the public sector plays a dominant role in the economy. This can be the case for many resource-rich economies and the GCC countries in particular, where the governments use the natural resources' rents for providing social services and investing in the infrastructure of their countries.

Thus far, all the financial development measures discussed are associated with financial depth. The only exception is found in Beck (2011) which utilises financial development measures that capture the depth as well as the efficiency of the banking sector. As more data become available, research in this area ought to consider other measures of financial development that take into account the financial depth, efficiency, access and stability.

Regarding the direction of causality between the two variables, the findings of the reviewed studies are contradictory. Research that examines the different causal relationships in different regions and countries is thus needed. Scholars should consider exploring the economic structures and characteristics that contribute to the differences in the finance-growth causal relationship across regions and countries. In the case of the GCC region, Chuah and Thai (2004) and Hamdi et al. (2012) find evidence of a bidirectional relationship. Further research should use other measures of banking sector development and investigate methods to confirm the relationship. From Chuah and Thai's findings, which show that unlike the relationship in the other GCC States, finance leads growth in Qatar, scholars interested in studying the causal relationship in the GCC countries should also explain the possible different relationships among the GCC countries.

Barajas et al. (2013b) suggest that the oil-exporting countries in the MENA region benefit less from financial deepening. This poses a number of questions for further research. The first is whether the finance-growth relationship in the GCC countries is different in comparison to that in other resource-based economies and in comparison to the relationship in the other countries at large. If so, the second question is: What are the economic factors behind those differences?

A number of researchers also recommend areas for further research. Darrat (1999) suggests considering the relationship by disaggregating the economic sectors to identify the effect of financial deepening on each sector. Exploring the relationship between the development of the banking sector and the growth in the different economic sectors can highlight the significance of the banking sector development for each economic sector and vice versa. It can also indicate the effect of the banking sector development on the economic diversification of the studied countries. One of the challenges that would face such research is the availability of economic growth data segregated by sectors.

Moreover, Darrat (1999) also recommends studying the mechanism by which financial deepening affects economic growth. Despite proposing this research area in 1999, the review of the studies confirms that few have considered the channels that link financial development and economic growth in the resource-based economies and particularly in the GCC countries.

Beck (2011) suggests a number of areas for further research including the role of the financial sector in the boom-bust cycles in the resource-based economies. The study of the banking development in relation to the boom-bust cycles can be related to the research of Arcand et al. (2012) which demonstrates that financial deepening promotes economic growth up to a certain point after which the relationship turns negative between the two variables. Such a study in the context of the GCC countries can be of interest to scholars, practitioners, and policymakers alike in the light of the last boom-and-bust cycle in asset prices and economic activities in the region.

Hattendorff (2013) proposes investigating the interest groups in the resource-rich economies that prevent reforming the banking sector, thus contributing to its underdevelopment. He further recommends researching the effects of export concentrations and the lack of economic diversification in those economies.

Research in the area of the finance-growth nexus in resource-rich economies is relatively underdeveloped in comparison to the broader literature on the relationship between financial development and economic growth. Accordingly, there are a number of areas that scholars can consider for further research. The main research questions related to the GCC region based on this review can be summarised as follows:

- What is the nature of the relationship between banking sector development and economic growth in the GCC region and individual countries? Does the relationship differ between the GCC countries?
- What is the direction of causality between banking sector development and economic growth in the GCC region and individual countries? Does the direction of causality differ among the GCC countries?
- Does the finance-growth relationship differ in the GCC region in comparison to that of other resource-based economies?
- What are the characteristics influencing the relationship between banking sector development and economic growth in the GCC region and individual countries?
- What are other banking sector development measures that can be employed in investigating the relationship?
- Why are the banking sectors in the resource-based countries underdeveloped and have a smaller positive effect on long-term economic growth?

4.2 Review Question II

4.2.1 Introduction

The aim of this section is to critically review the existing research studies that directly or indirectly address the following question: "*What are the characteristics of the banking sector in the GCC*?" The intention of this review question is to pinpoint the key characteristics of the banking sector that can potentially be associated with the finance-growth nexus in the GCC region. To this end, the underlying review question is also

envisaged to expose potential gaps in the extant empirical literature that can be effectively researched in the future.

The envisaged advantage of the proposed review question is twofold in the sense that it purports to inform us of the various aspects peculiar to the banking sector in the region *per se*, as well as exploring the banking sector literature beyond the finance-growth nexus question. Thus it provides an opportunity to consider all the characteristics discussed in the literature and subsequently link them to the relationship between banking sector development and economic growth in the GCC. The review question, however, is not without limitations. The lack of constraints can result in an overwhelming number of research studies in the review that is beyond the scope of the research. Furthermore, by not specifying certain aspects of the banking sector—such as profitability, efficiency or competition—the review becomes unfocused. The weakness is mitigated by the fact that research on the GCC's banking sector is limited and has only been growing over the last decade or so (see Figure 6).

Table 17: Search Results for Review Question II

Search Engines & Databases	*Results Description*	*Number of Results*
ABI/INFORM	Number of results	716
	Relevant based on titles	102
EBSCO Business Sources	Number of results	398
	Relevant based on titles	56
IDEAS	Number of results	44
	Relevant based on titles	4
Total	*Total number of results*	*1,158*
	Total relevant	*162*

The search engines and databases search related to the second review question returned 1,158 research studies, as Table 17 shows. ABI/INFORM and EBSCO Business Sources accounted for 61.8% and 34.4% of the total number of results respectively. The number of relevant research studies is 162 or 14% of the total number of results. Table 18 highlights the inclusion and exclusion stages for the review question. Out of the 162 studies selected based on their titles, 28 are omitted due to duplication, 87 are disregarded after abstract examination, 22 are included through cross-referencing, and

21 are eliminated after full text review due to irrelevance or poor quality. The final number of research publications included for the review is 48 studies.

Table 18: Inclusion & Exclusion Stages for Review Question II

Inclusion & Exclusion Stages	*Number of Studies*
Relevant studies based on titles	162
Duplicates	28
Relevant studies after excluding duplicates	134
Irrelevant studies based on abstract review	87
Number of relevant studies based on abstracts	47
Studies added through cross-referencing	22
Studies excluded after full review due to irrelevance or poor quality	21
Papers included in the SLR	*48*

The rest of the section is organised as follows. The first subsection presents a critical review, and synthesis of the findings of the research studies associated with the first review question. This is followed by an evaluation of the study's findings in relation to the review question. The final subsection discusses the areas for further research.

4.2.2 RQ II Findings

4.2.2.1 Studies included in the SLR

A summary of the 48 research studies included in the review is given in Table 19. The table provides the names of the authors, year of publication, countries covered by the studies, data sample employed, research models, and the findings of the papers in relation to the review question.

Table 19: Summary of the studies included for RQ II

Author(s)	*Year*	*Countries Studied*	*Data*		*Model(s) Employed*	*Findings*
			From	*To*		*GCC Banking Sector Characteristics*
Mohammad I. At-Twaijri	1991	Saudi Arabia	Not disclosed	Not disclosed	Survey of the banking sector	The economy is considered the most significant external factor for banks in Saudi Arabia while demography is the least important.
Abdulkader Mohamed Ahmed and Nourredine Khababa	1999	Saudi Arabia	1987	1992	Multiple regression models	There is a positive relationship between a bank's performance and its size in Saudi Arabia.

Ali F. Darrat, Can Topuz and Tarik Yousef	2002	Kuwait	1994	1997	Data Envelopment Analysis (DEA)	The overall efficiency scores have been declining. The banks in Kuwait experienced 28% increase in productivity between 1994 and 1997. Higher market power and profitability levels are associated with higher levels of efficiency.
Waleed Murjan and Cristina Ruza	2002	Bahrain, Egypt, Jordan, Kuwait, Oman, Qatar, Saudi Arabia, Tunisia, and the UAE.	1993	1997	The H-statistic approach and multiple regression models	Banks in the GCC operate under monopolistic competition market conditions. In comparison to the non-oil producing Arab countries, the level of competition is lower in the GCC banking industry.
Musa Essayyad and Haider Madani	2003	Saudi Arabia	1989	2001	Multiple regression models	The concentration ratios and the HHI based on loans measures indicate high concentration levels in the Saudi banking sector. The correlation between banking sector development and concentration is negative. Further, over 50% of the variation in banks' profitability is explained by its positive relationship with the oil prices and exports.
Naceur Jabnoun and Hussein A. Hassan Al-Tamimi	2003	UAE	NA	NA	Factor analysis, correlation analysis, and multiple regression models	The human skills dimension is the most important service quality dimension in the UAE banking sector.
M. K. Hassan, A. Al-Sharkas and A. Samad	2004	Bahrain	1998	2000	DEA, the Malmquist index, correlations analysis, and multiple regression models	Bank efficiency in Bahrain improved between 1998 and 2000 from 40% to 43%. The bank size, bank capital, and ROA are positively associated with bank efficiency in Bahrain while market power is negatively related to the overall efficiency.
Catherine Boone & Clement Henry	2004	MENA and SSA countries	1980	2000	The Herfindahl–Hirschman Index (HHI) approach	The banking sector in the GCC is characterised as one in which there are high levels of concentration but low government ownership. There is a close relationship between the governments and the private capital in the GCC due to the ties between the indigenous commercial elite and the ruling elite.
Quhafa Mahasneh	2004	UAE	NA	NA	Survey of the banking sector	The banks and finance firms in the UAE adopt some elements of strategic orientation in relation to customer focus but not in analysing competition and implementing strategy.
David Grigorian and Vlad Manole	2005	Bahrain, Kuwait, Qatar, UAE, and Singapore.	1997	2003	DEA	The overall technical efficiency of the banking sector in Bahrain is higher than in Kuwait, the UAE, and Qatar. The levels of scale efficiency of banks in Bahrain, the UAE, and Qatar are higher than in Singapore.
Ali F. Darrat, Salah S. Abosedra and Hassan Y. Aly	2005	UAE	1973	2000	The ADF, the Phillips-Perron, the Weighted-Symmetric, the Johansen approach, and the ECM	There is a long-term relationship between financial development and economic growth volatility in the UAE.
Saeed Al-Muharrami, Kent Matthews and Yusuf Khabari	2006	GCC countries	1993	2002	The HHI, the H-statistic approach, and multiple regression models	The GCC banking sector is generally becoming less concentrated. The competition among banks can be described as either monopolistic competition or perfect competition.

Hussain A. Hassan Al-Tamimi and Naceur Jabnoun	2006	UAE	1987 (2001 for the survey)	2000	OLS regression analysis, and analysis of variance (ANOVA)	The paper concludes that foreign banks in the UAE performed better than their national counterparts in terms of quality dimension of human skills and ROE financial measures.
Ibrahim Al-Karasneh and Ali Bolbol	2006	All six GCC Member States	1995	2004	OLS regression models	Banking sector concentration is positive for economic growth up to a certain level of financial development after which the relationship turns negative.
Hassan Y. Aly and Magda Kandil	2006	GCC Member States	1973	2005	The ADF the Phillips-Perron, and the Weighted Symmetric testing procedures, the Johansen cointegration, and the ECM	Banking sector development reduces the volatility in economic growth of the GCC economies in the long-term.
Hassan Aly, Fatima Al-Shamsi, and Yehia Bassiouni	2006	UAE	1990	2004	DEA, and multiple regression models	The banking sector efficiency in the UAE is relatively low compared to other regional countries as well as developed countries. The number of branches and the percentage of female employees are positive for the bank efficiency while the age of the bank, number of employees with short work experience, and the percentage of national employees are negative for the levels of efficiency.
Saeed Al-Muharrami	2007	GCC countries	1993	2002	The Malmquist index	The GCC's banks' average efficiency declined between 1993 and 2002 due to a decrease in technical efficiency. The banks failed to transform their investment in technology into efficiency gains.
Salim Chahine	2007	GCC countries	2002	2004	The OLS, and 2SLS	The commercial banks with diversified activities have higher market valuation in the GCC region. The foreign bank and corporate ownerships are positive for banks' valuation while domestic corporate ownership is negative. Greater activity diversification and board size are negative for market valuation.
Idries Al-Jarrah and Philip Molyneux	2007	Bahrain, Egypt, Jordan, and Saudi Arabia	1992	2000	The stochastic frontier with the Fourier flexible functional form	Both the levels of profit and cost efficiency are higher in Bahrain than in Saudi Arabia. The profit efficiency is higher for Islamic banks compared to other types of bank and is also higher for larger banks.
Hussein A. Hassan Al-Tamimi and Ahmad M. Lootah	2007	UAE	1999	2003	DEA	Both operational and profitability efficiency improved in a commercial bank in the UAE between 1999 and 2003.
Rima Turk Ariss, Rasoul Rezvanian and Seyed M. Mehdian	2007	All six GCC member countries	1999	2004	Linear programming, and the Malmquist index	The efficiency level of the banking sector is 77.59% for the GCC and exhibited a negative trend between 1999 and 2004. The bank inefficiencies are associated with allocative and technical inefficiency. The majority of the banks (78%) in the GCC region are either operating at optimal or above their optimal size and are thus unable to improve efficiency levels by expanding operations.

Ramakrishnan Ramanathan	2007	Six GCC Member States	2000	2004	DEA and the Malmquist index	Banks' efficiency across the GCC region was constant between 2000 and 2004 on average with technological change regressing for most countries.
Ghassan Omet, Ibrahim Saif and Hadeel Yaseen	2008	Jordan, Kuwait, Oman, and Saudi Arabia	1997	2006	The Period Seemingly Unrelated Regression and Pooled Estimated Generalised Least Squares method	Deposit insurance policy does not affect the level of deposits supplied to banks. Bank discipline is absent in the GCC countries, evidenced by the clients willing to supply funds to banks with higher loans to total assets and with lower capital adequacy ratios. The depositors however supply more funds to more liquid and more profitable banks.
Saeed Al-Muharrami	2008	Kuwait	1993	2002	The HHI, the H-statistic, and multiple regression models	The banking sector in Kuwait exhibited an increasing trend in the level of market concentration between 1993 and 2002. The banks operate under perfect competition market conditions.
Saeed Al-Muharrami	2009	Saudi Arabia	1993	2006	The H-statistic, the k-bank concentration ratio, the HHI, and multiple regression analyses	The Saudi banking industry has exhibited a decline in market share concentration between 1993 and 2006 and is now considered to be unconcentrated. The study suggests that the industry operates under monopolistic competition.
Saeed Al-Muharrami and Kent Matthews	2009	GCC countries	1993	2002	Multiple regression models	The study shows that even in the presence of technical efficiencies, the profitability of the banking sector in the GCC is explained by the small number of banks and the high barriers to enter the market (i.e. the market structure).
Samir Abderrazek Srairi	2009b	GCC countries	1999	2006	The pooled OLS, the fixed effect model, the random effect model, and the Hausman test	The profitability of banks in the GCC is positively influenced by capital adequacy and credit risk. The money supply and real GDP are also positively linked to the banks' ROA. Similarly, stock market capitalisation and banking sector concentration are positive for banks' profitability.
Rima Turk Ariss	2009	12 MENA countries (Algeria, Bahrain, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Turkey, and the UAE.	2000	2006	The H-statistic approach and multiple regression models	Banks in the GCC countries operate in a monopolistic competition environment with the exception of banks in Bahrain that face perfect competition market conditions.
Omar Masood, Bora Aktan and Sahil Chaudhary	2009	Saudi Arabia	1999	2007	The ADF test, the Johansen co-integration test, and the Granger causality test	A stable long-term relationship exists between ROE and ROA in the Saudi banking sector. A causal relationship runs from ROE to ROA but not the reverse.
Tigran Poghosyan and Heiko Hesse	2009	Algeria, Bahrain, Iran, Kuwait, Libya, Oman, Qatar, Saudi Arabia, Sudan, United Arab Emirates, and Yemen	1994	2008	The GMM	There is no direct relationship between oil prices and bank profitability in the GCC region. The relationship is indirect and is via the macroeconomic variables. Capitalisation and liquidity have a positive effect on bank profitability but inefficiency is negative for profitability.

Samir Abderrazek Srairi	2009a	GCC member countries	1999	2007	The stochastic frontier analysis (SFA) and regression analyses	The banks' cost and profit efficiency levels improved in the GCC region between 1999 and 2007. The price of labour, funds and physical capital are all positively associated with total cost and total profit. The higher the GDP per capita and market concentration the higher the total costs and total profits. The bank size is negative for the cost efficiency. The higher levels of equity to total assets ratio and the ROAA improve the levels of efficiency while the operation cost is inversely related to efficiency. The loans to total assets ratio is positively linked to profit efficiency but negatively linked to cost efficiency.
Hussein A. Hassan Al-Tamimi	2010	The UAE	1996	2008	The OLS regressions	The performance of conventional national banks in the UAE is positively associated with the market concentration and liquidity.
María Soledad Martínez Pería, Roberto Rocha and Diego Anzoategui	2010	The MENA countries group consists of 12 countries: Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, and the UAE. 122 countries from East Asia and Pacific, Eastern Europe, the Former Soviet Union, Latin America and Caribbean, South Asia, and Sub-Saharan Africa are included in the study to form the other regions' groups.	1994	2008	The H-statistic approach, the Learner index, and multiple regression models	The level of bank competition is lower in the GCC countries compared to the other MENA countries and other developing regions. The differences in the level of competition are explained by the credit information environment and the ease of entry into the banking sector,
Belaid Rettab, Hossein Kashani, Lamia Obay and Ananth Rao	2010	GCC countries	2001	2005	The HHI, the DEA, the SFA, multiple regression analysis, and the multivariate analysis of variance	The banking sector in the UAE is not concentrated but it is concentrated in Oman and Qatar. There is no evidence of market power or collusive behaviour across the GCC banks. The banking sector performance in the GCC is driven by efficiency. The DEA efficiency level and the ROAE are positively linked while the level of capitalisation, the expense to income ratio, and expense to total assets ratio are negative for profitability.
Joseph Antoine Haskour, Khalid Shams Abdulqader, and Rami Zeitun	2011	GCC countries	2002	2008	The Lerner index, the HHI, and multiple regression models	The market power is negatively associated with market concentration in the GCC banking sector. Accordingly, consolidating the banking system reduces market power. The relationship between market power and bank size in the region is positive up to a certain point beyond which the relationship turns negative.
Sami Ben Naceur and Mohammed Omran	2011	10 MENA countries: Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Saudi Arabia, Tunisia, and United Arab Emirates	1988	2005	The GMM	Compared to the MENA region, the GCC banking sector is more developed, efficient, and profitable. The government ownership is relatively lower than in the MENA regions and is dominated by family businesses' ownerships.

Samir Abderrazek Srairi	2011a	GCC countries	1999	2007	The Malmquist index, and multiple regression analyses	Bank productivity improved as a result of financial liberalisation undertaken by the GCC countries in the early 2000s. Size is positively linked to productivity and technical change while diversification is negatively associated with most of the Malmquist indices. The banks' management quality and loan intensity have a negative effect on efficiency and technical change in the GCC region. The money supply, GDP per capita growth, and financial development variables are positively associated with all the Malmquist indices.
Dennis Olson and Taisier A. Zoubi	2011	Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, and the UAE	2000	2008	The generalised least squares panel estimator, the Hausman test, and a translog flexible functional form	The levels of profit, cost and scale efficiency of the banks operating in the GCC countries are higher than those for banks operating in the other MENA countries on average.
Mahfoudh Abdul Karem Al-Musalli and Ku Nor Izah Ku Ismail	2012	GCC countries excluding Kuwait	2008	2010	The value added intellectual coefficient method, and OLS regressions	The presence of foreign banks leads to deterioration in the IC performance of local banks, adherence to Islamic Sharia is positively associated with IC performance, and banks' z-score is positively linked to IC performance.
Lawrence S. Tai	2012	UAE	2003	2011	The Lerner index, the distribution-free approach (DFA), the Granger causality test, and the ADF test	Both competition and efficiency decreased in the UAE banking sector between 2003 and 2011. There is no evidence of a causal relationship between competition and efficiency.
Osama M. Al-Hares, Naser M. AbuGhazaleh and Ahmed Mohamed El-Galfy	2013	GCC countries	2003	2011	P-values	Banks in the GCC hold sufficient capital on average to meet the new Basel capital adequacy requirements.
Ritab Al-Khouri	2013	GCC countries	2004	2010	The generalised least square random effect (GLS), and the GMM	The paper concludes that government ownership is positively associated with bank stability in the GCC. However, there is limited evidence of a negative relationship between government ownership and bank performance.
Mejbel Al-Saidi and Bader Al-Shammari	2013	Kuwait	2006	2010	The OLS regression, and 2SLS regression	Bank performance in Kuwait is negatively affected by board size and ownership concentration but is positively linked to the role duality.
Azzeddine Azzam and Belaid Rettab	2013	GCC countries	2001	2005	The Non-linear Two-Stage Least Squares, and the Non-linear Three-Stage Least Squares	The paper shows that the loan demand is inelastic for the Islamic as well as the conventional banks. It also suggests a positive relationship between the demand for loans and GDP for conventional banks. The paper illustrates that increasing Islamic loan concentration is welfare-neutral while increasing the conventional loan concentration is welfare-enhancing in the GCC region.
Sree Rama Murthy	2013	GCC countries	2006	2009	The logit regression method	Credit and asset quality management, liquidity management, cost management, and profitability determine the GCC banks' performance during crises. The cost to income ratio in the GCC banking sector is below the international average.

Syed Najaf Ali Shah and Suchi Dubey	2013	UAE	NA	NA	Survey of the banking sector	The performance of banks and insurance companies in the UAE is positively associated with market orientation measures.
Tamer Mohamed Shahwan and Yousef Mohammed Hassan	2013	UAE	2009	2009	DEA	The majority of banks in the UAE have high levels of profitability and social disclosure efficiency but low levels of marketability efficiency. The high efficiency levels are associated with the technical efficiency rather than the scale efficiency.
Mohamed Trabelsi, Ibrahim Elbadawi, and Dhuha Fadhel	2014	GCC Member States	2004	2011	The GMM	Economic growth and bank size are negatively related to bank capital buffer. The larger banks hold lower capital buffers during economic booms. Banks with higher liquidity hold less capital buffers during boom times and more during busts.

As Figure 6 illustrates, the number of researches on the banking sector in the GCC published in the 1990s are limited to two studies. The research interest in this area, however, increased in the early 2000s and the number of publications has been accelerating since 2006. The highest number of studies produced in one year reached the highest level in 2009 and 2013. Such a trend reflects the increased interest among scholars in researching topics related to the banking sector in the GCC States.

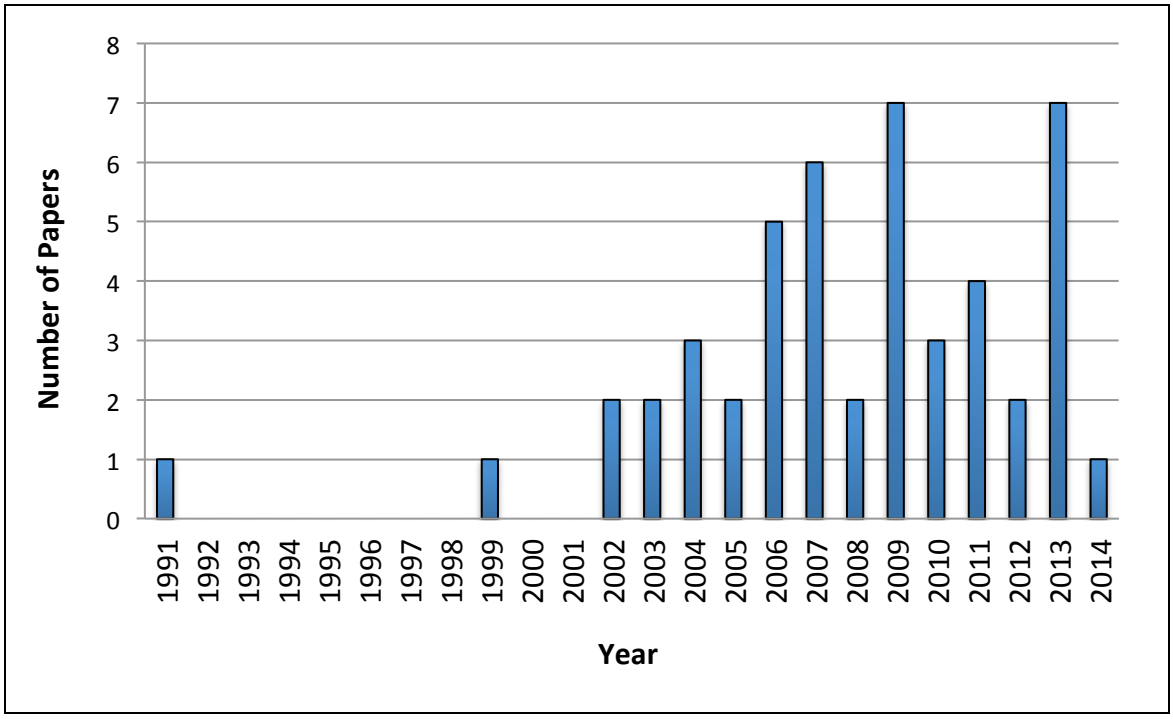

Figure 6. Number of study publication per year

The majority of the 48 studies included in the review are considered to be academic papers. Three studies, however, are deemed to be academic as well as policy papers. In terms of the type of publication, 39 studies are published in scholarly journals, five in conference proceedings and four in working paper series.

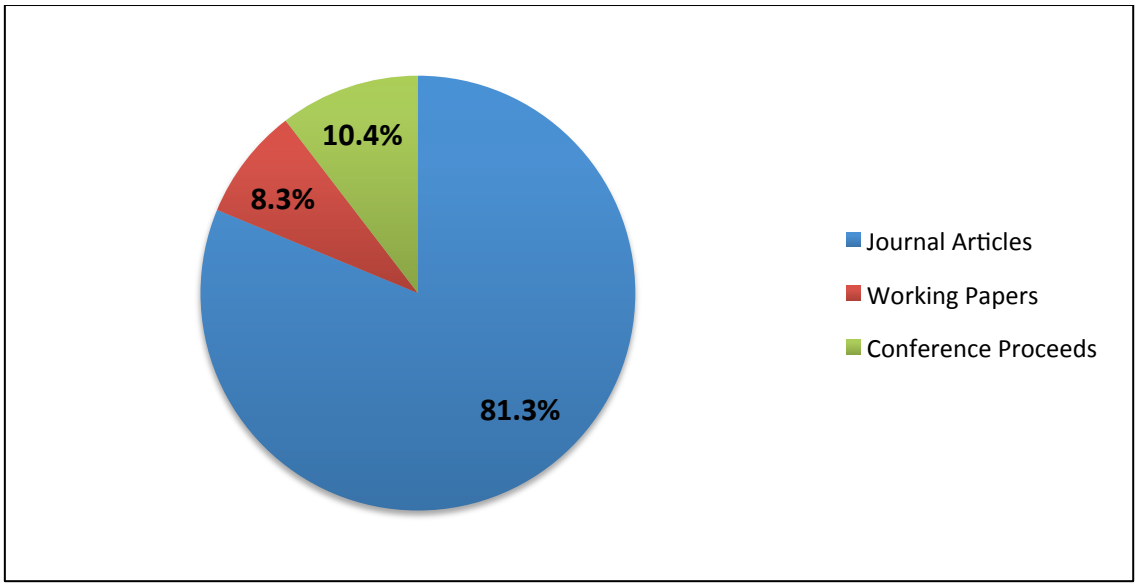

Figure 7. Types of publication in which the studies are published

Table 20 lists the names of the publications in which the reviewed studies appear most frequently. The table illustrates that the research studies are published across different scholarly journals, conference proceedings and working paper series, and only in seven publications does more than one of the reviewed studies appear.

Table 20: Top publications in which the studies are published

Name of the Publication	*Number of Studies*	*Percentage of All Studies included*
Applied Financial Economics	2	4%
Emerging Market Review	2	4%
ERF 13th Annual Conf. Proceedings	2	4%
IMF Working Paper	2	4%
Int. Journal of Bank Marketing	2	4%
Int. Journal of Productivity & Performance Management	2	4%
Studies in Economics and Finance	2	4%
Other Publications	1 each (34 Studies)	72%

In terms of the study topics, bank efficiency is investigated in 15 of the 48 reviewed studies, 12 consider bank profitability and performance, and 11 research the competition and market concentration in the banking sector respectively. Table 21 highlights the thematic areas that are most researched in the reviewed studies.

Table 21: Study themes covered in more than 10% of the studies

Study Theme	*Studies Considering the Theme*	*Percentage of All Studies included*
Bank efficiency	15	36%
Bank profitability & performance	12	29%
Bank comp. & market concentration	11	26%
Market power & structure	7	17%
Bank productivity	4	10%

Empirical methods are present in all of the reviewed studies. In five studies, surveys of banks and banks' clients are used whilst in one study by Boone and Henry (2004)

empirical study methods as well as case studies are utilised for various countries of the MENA region and Sub-Saharan Africa (SSA).

Table 22: Reviewed studies by research method employed

Research Method	*Studies Considering the Theme*	*Percentage of All Studies included*
Empirical Study	42	88%
Empirical Study & Survey	5	10%
Empirical Study & Case Study	1	2%

Table 23 suggests that the banking sector in at least one GCC member state is researched by 50% or more of the reviewed studies. The UAE and Saudi Arabia are the most researched with 73% and 65% of the reviewed studies considering their banking sectors respectively.

Table 23: Countries covered in more than 10% of the studies

Country Name	*Studies Considering the Country*	*Percentage of All Studies included*
UAE	35	73%
Saudi Arabia	31	65%
Bahrain	27	56%
Kuwait	27	56%
Oman	25	52%
Qatar	24	50%
Jordan	6	13%

Finally, Table 24 lists the ten studies with the largest data samples employed. Aly and Kandil (2006), Darrat et al. (2005), and Boone and Henry (2004) are the only studies that include data samples of 20 years or more. The average data sample length for all the 48 studies included in the review is 8.7 years.

Table 24: Top 10 studies in terms of data sample length

Author(s)	*Year of Publication*	*Length of Data Sample (in Years)*
Aly & Kandil	2006	32
Darrat, Abosedra & Aly	2005	27
Boone & Henry	2004	20
Ben Naceur & Omran	2011	17
Aly, Al-Shamsi & Bassiouni	2006	14
Poghosyan & Hesse	2009	14
Martinez Perία, Rocha & Anzoategui	2010	14
Al-Tamimi & Jabnoun	2006	13
Al-Muharrami	2009	13
Essayyad & Madani	2003	12
Average of All 48 Studies		8.7

4.2.2.2 A Critical Review of the Findings

This section provides a critical review of the studies associated with the second review question and discusses their findings. Due to the heterogeneity of the studies' research questions, the studies are combined into categories based on their research topics. Three categories with common research themes are identified while a fourth category groups the other studies with various research topics. For studies with more than one research domain, the findings and their relevance to each category are assessed to determine the most appropriate classification.

The first category includes studies that are related to bank efficiency and productivity. These two topics are combined in one group due to the overlap in their literature. As Table 25 indicates, 13 studies fall into this group with two papers, i.e. Grigorian and Manole (2005) and Tai (2012), also considering bank competition and market structure. The second category is associated with bank profitability and performance, and incorporates 13 studies as well. A number of research papers in the second group study bank profitability and performance in relation to the banks' board of directors, market orientation, service quality, and capital regulations as well as oil prices and financial crises. The third group consists of research concerned with market concentration and

competition in the banking sectors of the GCC region. The fourth group consists of 11 research papers and covers various research topics related to the GCC banking industry. Each of the four categories is discussed in a separate subsection below.

Table 25: Reviewed studies research themes & categories

	Author(s)	Year of Publication	Bank Efficiency	Bank Productivity	Bank Performance	Bank Market Concentration	Bank Market Competition	Other Topics
1	Al-Tamimi & Lootah	2007	X					
	Aly, Al-Shamsi & Bassiouni	2006	X					
	Tai	2012	X				X	
	Shahwan & Hassan	2013	X		X			
	Hassan, Al-Sharkas & Samad	2004	X	X				
	Grigorian & Manole	2005	X					
	Al-Jarrah & Molyneux	2007	X					
	Srairi	2009a	X					
	Darrat, Topuz & Yousef	2002	X	X				
	Ramanathan	2007	X	X				
	Ariss, Rezvanian & Mehdian	2007	X	X				
	Al-Muharrami	2007		X				
	Srairi	2011a		X				X
2	Ahmed & Khababa	1999			X	X		
	Masood, Aktan & Chaudhary	2009			X			
	Al-Tamimi	2010			X			
	Srairi	2009b			X			
	Rettab, Kashani, Obay & Rao	2010	X		X	X		
	Ben Naceur & Omran	2011			X			
	Olson & Zoubi	2011	X		X			
	Al-Saidi & Al-Shammari	2013			X			X
	Shah & Dubey	2013			X			X
	Al-Tamimi & Jabnoun	2006			X			X
	Al-Hares, AbuGhazaleh & El-Galfy	2013			X			X
	Poghosyan & Hesse	2009			X			X
	Murthy	2013			X			X
3	Essayyad & Madani	2003			X	X		
	Al-Karasneh & Bolbol	2006				X		X
	Azzam & Rettab	2013	X			X		
	Al-Muharrami & Matthews	2009			X	X		
	Murjan & Ruza	2002					X	
	Ariss	2009					X	
	Martinez Pería, Rocha & Anzoategui	2010					X	
	Al-Muharrami	2008				X	X	
	Al-Muharrami	2009				X	X	
	Al-Muharrami, Matthews & Khabari	2006				X	X	
	Haskour, Abdulqader & Zeitun	2011				X	X	
4	Darrat, Abosedra & Aly	2005						X
	Aly & Kandil	2006						X
	Trabelsi, Elbadawi & Fadhel	2014						X
	At-Twaijri	1991						X
	Boone & Henry	2004						X
	Al-Khouri	2013						X
	Chahine	2007						X
	Mahasneh	2004						X
	Omet, Saif & Yaseen	2008						X
	Al-Musalli & Ismail	2012						X
	Jabnoun & Al-Tamimi	2003						X

4.2.2.2.1 Bank Efficiency & Productivity

A number of scholars considered banking sector efficiency and productivity in the UAE. Al-Tamimi and Lootah (2007) examine the operational and profitability efficiency of 15 branches of a commercial bank between 1999 and 2003. The authors employ two DEA models. The DEA is a technique based on a linear programming approach in which the performance of a bank is measured against the best practice cost and production frontier. The first model is the DEA operational efficiency which uses the employees' expenses and other expenses as inputs, and the total loans, total deposits and number of transactions as the outputs. The second model is the DEA profitability efficiency. In this model the input variables are interest expense, employees' expenses, and other operating expenses, while the output variables are interest revenues and non-interest revenues.

The paper findings indicate that both operational and profitability efficiency improved in the commercial bank under consideration during the study's period. As the study is limited to one commercial bank, it is uncertain if such results represent the trend in the banking sector in the UAE. Including branches from other banks could provide results that are more representative of the UAE commercial banking industry. Further, the discussion of the result could be enriched by comparing the efficiency levels in this study with those of similar studies for different countries.

Another study that focuses on the UAE banking sector is that of Aly et al. (2006). Their paper assesses the economic efficiency of the banking system in the UAE using data from 22 banks for the period from 1990 to 2004. The authors utilise the DEA model to assess the level of efficiency in the UAE banking sector. The DEA input variables are labour, capital, and deposits, while the output variables are loans and investments. The paper also regresses the bank efficiency levels on bank variables to determine the effect of the bank characteristics on the level of efficiency.

Aly et al. (2006) find that the banking sector efficiency in the UAE is relatively low compared to other regional countries as well as developed countries. This is due to allocative rather than technical inefficiency, i.e. banks are better at utilizing available

inputs than choosing the proper input mix, given the prices of inputs. The number of branches and the percentage of female employees are positive for bank efficiency while the age of the bank, number of employees with short work experience, and the percentage of national employees are all negative for the levels of efficiency. The study adds to the bank efficiency in the GCC region literature by considering the effect of bank-specific characteristics on the degree of efficiency.

Considering 23 listed banks in the UAE between 2003 and 2011, Tai (2012) investigates the level of competition and efficiency of the banking sector. He claims that the higher levels of competition and efficiency in the banking sector are expected to result in welfare gains by reducing the prices of financial services and thus stimulate investment and growth. The paper utilises three different models. The first is the Lerner index model which is employed to estimate the level of competition. The second is the DFA and is conducted to assess the levels of efficiency in the banking sector. This model estimates the translog cost function for banks that include a bank-specific dummy variable. The third approach is the Granger causality test.

The results show that the Lerner index decreased between 2003 and 2011. This indicates that the competition levels among national banks in the UAE dropped during this period. The model also suggests that out of 18 banks, 15 gained more market power. Similarly, the DFA results illustrate that the efficiency scores fell from 0.7441 in 2003 to 0.7099 in 2011 in the UAE banking sector, suggesting that efficiency deteriorated during the studied period. Finally, the Granger causality test finds no causal relationship between competition and efficiency in the UAE banking sector. The paper does not provide any explanation for the fall in the levels of competition and efficiency in the UAE.

The last study that solely focuses on the UAE banking sector is that of Shahwan and Hassan (2013). The authors measure and assess the profitability, marketability, and social disclosure efficiency of 23 listed banks. Similarly to the other studies, efficiency is assessed using a number of DEA models. The results relating to the profitability efficiency suggest that only five banks are deemed to be efficient. The authors argue

that scale inefficiency explains the profitability inefficiency in the UAE banking sector. Likewise, the findings associated with the marketability model illustrate that the banks experience marketability inefficiency. The paper attributes the results here to technical rather than scale inefficiency. The DEA model for social disclosure efficiency, in contrast, suggests that the UAE banks are efficient with respect to social disclosure.

A number of researches also concentrate on the banking sector in Bahrain. Hassan et al. (2004) study the relative efficiency of the banking sector in Bahrain between 1998 and 2000. The authors employ a DEA in which labour, capital, and funds are the input variables, while short-term and long-term loans are the output variables. Another approach employed by the paper is the Malmquist index which is aimed at measuring the productivity growth in the banking industry in Bahrain. The index is decomposed into technical efficiency, which indicates the closeness of a bank to the efficient frontier, and technical change, which gauges how much the benchmark production frontier shifts at each bank's observed input mix. Thus the former reflects the catching up effect while the latter captures the technical innovation or shock. The paper also estimates the correlations between the profitability measures and the efficiency measures. Finally, the study regresses the overall efficiency scores on total assets, market power, ROA, loans to total assets ratio, and equity to total assets ratio.

The findings indicate that bank efficiency in Bahrain improved between 1998 and 2000 from 40% to 43%. The inefficiency is mainly attributed to pure technical inefficiency rather than scale inefficiency. This suggests that bank managers are better at selecting the input mix, given the input prices, than in utilising the input resources. The results associated with the Malmquist index illustrate that Bahrain banks have experienced about a 9% productivity growth during the studied period. Bank size, bank capital, and ROA are positively associated with bank efficiency in Bahrain while market power is negatively related to the overall efficiency. The paper contributes to the literature by being the first to examine the efficiency of the banking system in Bahrain.

Comparing the efficiency of the banking sector of Bahrain to those of other GCC countries and Singapore, Grigorian and Manole (2005) find that the overall technical

efficiency of the banking sector in Bahrain is higher than in Kuwait, the UAE, and Qatar. The research evaluates the efficiency of the banking sectors using the DEA model. The results are based on data for 49 banks from Bahrain, Kuwait, Qatar, UAE, and Singapore between 1997 and 2003. The authors also find that the levels of scale efficiency of banks in Bahrain, the UAE, and Qatar are higher than in Singapore. The results suggest that the inefficiencies in the GCC's banks are largely associated with pure technical inefficiencies rather than scale inefficiencies.

Grigorian and Manole (2005) contribute to the development of the GCC countries' banking literature and to Bahraini practitioners by providing insights into the areas of inefficiency in the industry. The paper, however, fails to acknowledge previous research—where bank efficiency in the region is considered—hence, basing its conclusions entirely on one model.

In another study that considers Bahrain along with Egypt, Jordan and Saudi Arabia, Al-Jarrah and Molyneux (2007) investigate the efficiency of the banking sector in those countries. The authors utilise the data for the period from 1992 to 2000 and use the stochastic frontier with the Fourier flexible functional form to measure the degree of efficiency in the countries under consideration. In this model, the price of funds, price of labour, and price of physical capital are set as the input variables while the total aggregate loans, total aggregate other earning assets, and off-balance sheet activities are set as output variables.

The research concludes that cost efficiency averaged at 95% for banks operating in the four countries between 1992 and 2000. This indicates that the same level of output can be produced using 95% of the current inputs when banks operate on the efficiency frontier. The authors suggest that the levels are 10% to 15% lower than those found in the literature. In addition, the findings show that the levels of both profit and cost efficiency are higher in Bahrain than in Saudi Arabia. The profit efficiency is also found to be higher for Islamic banks and for larger banks in comparison to other types and sizes of bank. The paper contributes to the literature by measuring the efficiency for each country, type of bank, and size of bank. The research, however, does not disclose

the rationale behind selecting Bahrain, Egypt, Jordan, and Saudi Arabia from all the Arab countries. Further, it fails to explain the findings for each country in the light of its experience and unique characteristics.

In contrast to the studies discussed so far, Srairi (2009a) considers the efficiency of the banking sector in all GCC countries. The study compares the efficiency across countries and between conventional and Islamic banks. In doing so, the author employs the SFA to estimate the cost and profit efficiency frontiers. Further, the study investigates the determinants of bank inefficiency in the region by regressing the total cost and total profits on the total assets, capital adequacy, ROAA, credit risk, and operation cost.

The results show that the banks' cost and profit efficiency levels improved in the GCC region between 1999 and 2007. In addition, Srairi (2009a) shows that the price of labour, funds and physical capital are all positively associated with total cost and total profit. The elasticity of cost of labour is higher, making it more important than the other input prices for controlling costs. The paper also finds that the higher the GDP per capita and market concentration the higher the total costs and total profits, whereas bank size is negative for cost efficiency. Furthermore, the results suggest that the higher levels of equity to total assets ratio and the ROAA improve the levels of efficiency while the operation cost is inversely related to efficiency. Finally, the loans to total assets ratio is positively linked to profit efficiency but is negatively linked to cost efficiency. The study contributes to the literature by its novel application of the SFA model to the GCC banking sector and the various results that pave the way for further research in this area.

The research studies that consider the efficiency as well as the productivity of banks in the GCC countries include Darrat et al. (2002), Ramanathan (2007), and Ariss et al. (2007). Darrat et al. (2002) focus on the banking sector in Kuwait and assess its levels of efficiency, productivity growth, and technological change between 1994 and 1997. The authors employ the DEA model for investigating efficiency, the Malmquist to measure productivity, and regression analyses to determine the aspects of the banks' structure associated with the level of efficiency. The Malmquist index is the product of

two elements: technical efficiency change and technological change. The former refers to the closeness to the efficient frontier (catching up) while the latter is associated with the shifts in the benchmark production frontier at each bank's observed input mix (innovation or shocks).

Darrat et al. (2002) find that the smaller banks in Kuwait are more efficient than larger banks. This is while the overall efficiency scores have been declining and are lower than those of the US and the British banks. Furthermore, the paper shows that the banks in Kuwait experienced a 28% increase in productivity between 1994 and 1997 due to technological advances rather than technical efficiency. Finally, the regression analyses suggest that the higher market power and profitability levels are associated with higher levels of efficiency. The paper includes all the banks operating in Kuwait and contributes to practice as well as policy by providing insights into the efficiency and productivity of the banking sector.

Ramanathan (2007) broadens the context of the banking sector's performance and productivity investigation to include all the GCC countries. The author includes data for 55 commercial banks from across the region for the period between 2000 and 2004. The study utilises two approaches in assessing the performance of banks. The first is the DEA where the fixed assets, deposits, short-term funding, equity and personnel expenses are set as the input variables, and the loans and other earning assets are included as the output variables. The second approach is the Malmquist productive index which is aimed at measuring the change in efficiency over the studied period.

The DEA findings indicate that in 2004, banks in Kuwait were the most efficient followed by banks in Bahrain. This is while the results associated with the Malmquist productive index show that the banks' efficiency across the GCC region was constant between 2000 and 2004 on average with technological change regressing for most countries. Banks in Bahrain exhibited the highest gains in efficiency due to technical efficiency rather than technological change improvements. The study concludes those results without discussing their relevance and implications for the banking industry in the region.

Ariss et al. (2007) compare and contrast the efficiency performance, efficiency and technological change, and productivity growth of banks in the GCC region. Their paper argues that the globalisation of the financial markets and institutions has increased the competitive environment in the banking industry. This prompted banks to consider strategies that aim at improving efficiency to meet competition and demands of internationalisation. The authors use a non-parametric frontier approach and the Malmquist index measure to assess the efficiency and productivity of 45 commercial banks between 1999 and 2004.

The findings of Ariss et al. (2007) reveal that the average overall efficiency of banks in the GCC is 77.59%. The paper illustrates that the inefficiencies are attributed to the allocative (input-mix sub-optimisation) and technical (over-utilisation of inputs) inefficiencies. The paper also finds a negative trend in the overall efficiency score of banks across the region over the studied period. Furthermore, the results indicate that 78% of the banks in the GCC region are either operating at optimal or above their optimal size. Finally, the findings suggest that all six member countries experienced a decline in the productivity of their banking sectors due to technological regress. Although the paper introduces the reader to the banking sector in each country, it fails to discuss the results in the light of the experiences of each country.

Al-Muharrami's (2007) paper focuses exclusively on the productivity change in the banking industry of the GCC region. The author argues that the banking sector in the region was traditionally tightly regulated and sheltered from competition across borders. After the GCC member countries joined the World Trade Organization (WTO) however, markets were opened up and competition increased. This prompted the banking sector to minimise costs, and improve scale and output efficiencies in the face of the more competitive environment. The author calculates the Malmquist index using data of 52 commercial and Islamic banks for the period between 1993 and 2002. The results suggest that the GCC's banks' average efficiency declined between 1993 and 2002 due to a decrease in technical efficiency. He concluded that the banks failed to transform their investment in technology into efficiency gains. The findings do not

support his claim that the banking sector exhibited changes following the GCC countries' WTO membership. The paper, however, contributes to the development of the banking sector research by being one of the first to consider the productivity change in the banking industry using a pooled data for the GCC countries.

Based on a similar stance to that of Al-Muharrami (2007) which suggests that the liberalisation of the banking sector is associated with higher efficiency and productivity levels due to the increased competition, Srairi (2011a) examines the impact of financial liberalisation in the GCC region on the banking sector productivity growth. The paper estimates the Malmquist indices for the 1999-2003 period and the 2003-2007 period to assess the effect of banking sector liberalisation on productivity. Srairi (2011a) also regresses the total productivity change, technical change, and efficiency change on the bank-specific, macroeconomics, and financial development variables using a fixed effect model to investigate the determinants of the banking sector productivity.

The findings advocate that the financial liberalisation undertaken by the GCC countries in the early 2000s improved bank productivity. However, the results indicate that size is positively linked to productivity and technical change but diversification is negatively associated with most of the Malmquist indices. In addition, the bank's management quality and loan intensity have a negative effect on efficiency and technical change in the GCC region. Finally, the money supply, GDP per capita growth, and financial development variables are positively associated with all the Malmquist indices. The study contributes to the financial liberalisation literature by providing evidence from the GCC region. It also provides policy recommendations including the acceleration of financial liberalisation and bank mergers in the region.

4.2.2.2.2 Bank Profitability & Performance

The studies that considered the performance of the banking sector in the GCC focused on the individual countries as well as the region as a whole. Two studies that address Saudi Arabia are those of Ahmed and Khababa (1999) and Masood et al. (2009). The former study aims at measuring the performance and market power of the Saudi banking sector; the authors regress the performance measures—i.e. earnings per share

(EPS), ROA, and return on equity (ROE)—on the measures of business risk, market concentration, market size of the bank, and the size of the bank.

The pooled data model results show that the relationship between performance variables and the business risk is negative and statistically significant. The paper also finds negative links between performance and market concentration and bank market size. The size of the bank, measured by total deposit, however, is positively associated with the performance measures. The authors studied the majority of the commercial banks in Saudi Arabia and compiled data from a number of sources.

Masood et al. (2009), on the other hand, investigate the causal relationship between the ROA and ROE of banks in Saudi Arabia. Their paper employs data for 12 banks for the period from 1999 to 2007. The study then utilises the Johansen co-integration test to determine whether a long-term relationship exists between the ROE and ROA. Furthermore, the Granger causality test is conducted to determine if causality exists and, if so, its direction.

The cointegration test results indicate a stable long-term relationship between ROE and ROA. The findings associated with the Granger causality test, however, suggest that causality runs from ROE to ROA but not the reverse. Despite the results, it is unclear what the intention is behind investigating the causal relationship between two profitability variables. In addition, the study fails to consider the effect of other variables related to bank characteristics, bank efficiency and competitiveness, or the overall economic environment, to name but a few concerning bank profitability.

Al-Tamimi (2010), in comparison, considers banks' performance in the context of the UAE. The research assesses the factors that influence the performance of national Islamic and conventional banks in the UAE. The data for five Islamic and 17 conventional banks from 1996 to 2008 are exploited to estimate OLS regressions. In the regression models, the author sets the ROE and ROA as the dependent variables, while GDP per capita, bank total assets, total assets to GDP ratio, total loans to deposit ratio,

market concentration ratio, salaries to total assets, and number of branches are included as the independent variables.

The paper finds that the performance of Islamic banks is positively linked to cost and branch numbers, while market concentration and liquidity positively influence the performance of conventional banks. The research discussion of the results in relation to the UAE experience and theory is limited. Such discussion could improve the research outcome, particularly in the light of the counterintuitive findings for Islamic banks, which suggest that the relationship between profitability measures and costs is positive. The author, however, highlights that a limited number of papers examined the factors influencing the performance of banks in emerging markets and the UAE in particular. Srairi (2009b) is an example of such research for the GCC as a whole.

Srairi (2009b) intends to determine the bank characteristics, macroeconomic indicators, and financial structure that influence the profitability of conventional and Islamic banks in the GCC region. The paper employs three alternative models to estimate a panel regression model in which the ROA is regressed on number of bank, macroeconomic, and financial sector variables. The models are the pooled OLS, fixed effect and random effect. The author employs the Hausman test to select the most favourable model.

The Hausman test provides evidence that is in support of the fixed effect model. Based on the data for 66 banks from across the region, the fixed effect model results demonstrate that the profitability of banks in the GCC is positively influenced by capital adequacy and credit risk. The money supply and real GDP are also positively linked to the banks' ROA. Similarly, stock market capitalisation and banking sector concentration are positive for banks' profitability.

Another research paper that studies the determinants of banks' performance is that of Rettab et al. (2010). The study investigates the impact of banks' efficiency and market power in the GCC region on the banks' performance. In doing so, the paper calculates the HHI, DEA efficiency levels, and the SFA inefficiency for banks from across the region. Subsequently, Rettab et al. (2010) estimate four models where the return on

average equity (ROAE) is regressed on different combinations of the total assets, capital to total assets ratio, cost to income ratio, staff expense to total assets ratio, liquid assets to short-term liabilities ratio, loan loss reserves to gross loans ratio, market share by assets, HHI, DEA efficiency, and SFA inefficiency.

The market concentration measures (HHI) suggest that the UAE banking sector is not concentrated, the Saudi banking sector is moderately concentrated, and the banking industries in Oman and Qatar are concentrated. The authors find no evidence of market power or collusive behaviour across the GCC banks. Their paper also finds a positive relationship between the DEA efficiency level and the ROAE. The level of capitalisation, the expense to income ratio, and expense to total assets ratio all negatively affect the profitability of banks in the region.

The study, however, puts forward a number of hypotheses yet fails to relate the findings for each hypothesis. In addition, the authors introduce results in the conclusion section that are not discussed anywhere else in the paper. Overall, the paper contributes to the banking sector performance literature in the context of the GCC by examining the effect of bank efficiency and market power using different measures.

In the context of the MENA region, Ben Naceur and Omran (2011) assess the effect of bank competition, regulation, and financial and institutional development on the profitability and margins of commercial banks. The study examines the banking sector in ten MENA countries including five GCC Member States (Bahrain, Kuwait, Oman, Saudi Arabia and the UAE) and employs data for 173 banks from 1988 to 2005. To overcome the potential issues associated with the bank's profitability, of highly persistent profit, omitted variables, and endogeneity bias, the study uses a dynamic panel data and GMM estimator. The regression equations set the performance measures as the dependent variables with the others as the independent variables.

The relevant results for the GCC countries indicate that the banking sector is relatively more developed, profitable and efficient than its peers in the MENA region. Furthermore, the study finds that the banks in the GCC have relatively low government

ownership and are dominated by family businesses. The paper provides the results on the relationship between bank performance and the bank, institutional, and macroeconomic variables for the ten MENA countries as a group. Accordingly, the results of the regression analyses are not reported here as they can differ if only the GCC countries are considered.

Another paper that considers bank performance in the MENA region is that of Olson and Zoubi (2011). It compares the accounting-based and economic-based efficiency and profitability of banks in the MENA region. The research includes data for 83 banks from Egypt, Jordan, Lebanon, Morocco and the six GCC member countries for the period between 2000 and 2008. Using the generalised least squares panel estimator, the authors regress either ROA or ROE on the accounting-based variables. They estimate both the complex fixed effect and the computationally simpler random effects model. Subsequently, the paper selects one of the models based on the Hausman test. In addition the study employs a translog flexible functional form to estimate cost and profit functions similar to those suggested by Berger and Mester (1997). The total cost and profit are estimated by regressing each of them on the other economic-based variables as well as controlling variables, including GDP, inflation, GCC dummy variable, bank type dummy variable, and exchange listing dummy variable.

The findings demonstrate that the levels of profit, cost and scale efficiency of the banks operating in the GCC countries are higher than those for banks operating in the other MENA countries on average. This is whereas Bahraini banks operate at the highest cost and scale efficiency in the GCC region while Saudi banks are the least cost and scale efficient. The Kuwaiti and Emirati banks operate at the highest profitability efficiency levels whereas Bahraini banks are the least profit efficient in the GCC area. Despite its novel approach in employing the accounting-based as well as the economic-based variables using different empirical methods, the paper only refers to a few studies from the literature that examine bank profitability and efficiency in the MENA region.

In the GCC's banking sector literature, a number of studies consider bank performance in relation to the banks' board of directors, market orientation, service quality and

capital regulations, as well as oil prices and financial crises. Al-Saidi and Al-Shammari (2013) investigate the relationship between board of directors composition and bank performance in Kuwait. Based on the data for nine listed banks, the authors employ OLS and 2SLS regression analyses. In each regression model, the ROA and Tobin's Q (TQ) as measures of bank performance are regressed on measures of non-executive directors, family directors, role duality, board size, bank size, debt ratio, capital adequacy and ownership concentration. TQ is calculated as the sum of the book value of debt and market value of common stocks divided by total assets.

The results show that non-executive directors and the presence of family board members have no impact on bank performance. Board size and ownership concentration, however, are negatively associated with bank performance while role duality is positively linked to performance. One of the advantages of this paper is that the authors provide detailed background about the banking sector and corporate governance in Kuwait. In addition, they discuss the various theories' empirical studies related to the topic. However, the paper's limitations include the small sample size and the failure to explain a significant part of the variation in the dependent variable.

Shah and Dubey (2013) examine the nature of the relationship between market orientation and organisational performance in the UAE financial sector. The study employs measures of market orientation, profitability, business size, market share, and growth. The authors developed a questionnaire that consists of 13 questions (9 related to market orientation and 4 to firm performance), which is completed by 200 marketing executives from the financial sector. The paper uses correlation analyses to assess the relationships between the measures.

The individual correlations show that market orientation is positively correlated with each of the performance measures. The correlation with profitability is the highest at 0.746. Similarly, the correlation between the market orientation and overall performance index is positive. The authors argue that the paper provides a base for further research on market orientation and organisational performance in other sectors in the UAE.

Another paper that is related to bank performance in the UAE is that of Al-Tamimi and Jabnoun (2006). Their study aims at comparing the service quality and bank performance between national and foreign commercial banks operating in the UAE. The paper includes ROA and ROE as performance measures. The service quality is captured using three dimensions based on the work of Jabnoun and Al-Tamimi (2003): human skills, tangibles and empathy. The authors utilise the data for 46 banks for the period from 1987 to 2000 and a survey conducted in 2001 in this research. The paper uses the OLS regression analysis and ANOVA to test eight hypotheses.

The ANOVA results suggest no significant differences between national and foreign banks in overall service quality. The findings also show that foreign banks in the UAE performed better than their national counterparts in terms of the quality dimension of human skills and ROE financial measures. The research results are based on the financial data of the banks and the customer surveys. The use of the latter enabled the authors to collect specific data about customers' perception of the service quality. Compared to the use of secondary data collected for different purposes, the use of surveys improves the results of the research. The paper employs financial data for the period between 1987 and 2000 while the banks' customers' survey was conducted in 2001. The results could be improved by conducting the survey during the same period as for the financial data.

In an additional comparative study, Al-Hares et al. (2013) investigate the financial performance of banks in the GCC region by comparing the profitability, liquidity, efficiency, solvency and growth of the conventional banks to those of Islamic banks. The paper also compares the compliance of the banks in the region with the new Basel III capital standards. The data for 55 conventional banks and 20 Islamic banks from across the region are utilised in this study. The authors compare the average ratios for the conventional banks against those for the Islamic banks and use the p-values to statistically test if significant differences exist.

Al-Hares et al. (2013) find that bank efficiency measures are better for Islamic banks compared to conventional banks but the p-values indicate that there is no statistically significant difference between the bank types with respect to efficiency. The solvency ratios are superior for Islamic banks on average and the p-values suggest that there is a statistically significant difference between conventional and Islamic banks in this regard. In addition, Islamic banks show a higher growth rate between 2003 and 2011 in comparison with conventional banks. Finally, the authors report that for the majority of the banks in the GCC in 2011, capital adequacy ratios are above those required by the new Basel capital standard. In fact, the average capital ratio for the region is 16.7%.

In the context of the oil-exporting countries in the MENA region, Poghosyan and Hesse (2009) analyse the link between bank profitability and oil price shocks. The paper considers the banking sectors in all the GCC countries as well as Algeria, Iran, Libya, Sudan and Yemen. The authors examine the link between oil prices and bank profitability by estimating the GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998). In the model equation, the ROA as the profitability measure is regressed on the bank-specific, country-specific, and oil price related variables.

Poghosyan and Hesse (2009) find no direct relationship between oil prices and bank profitability in the GCC region. The relationship is indirect and is via the macroeconomic variables. The results illustrate that the investment banks are the most affected by oil price shocks. This is while capitalisation and liquidity have a positive effect on bank profitability but inefficiency is negative for profitability. In deriving those results, the paper employs four oil price related variables to capture the oil price and shocks. Further, the data sample is recent and covers the last boom in oil prices. The study could be more informative to the reader by introducing the banking sectors in the selected countries and discussing their development.

The last paper that considers the bank performance in the GCC is that of Murthy (2013). The study aims at assessing the financial management practices that enable banks to remain in the top quartile before and after the Global Financial Crisis. The author claims

that lessons can be learned from the financial management practices of banks that managed to outperform their peers before and after the financial crisis. Based on the data for 51 banks from the region, the paper adopts the logit regression method to identify the variables that differentiate the low ranked banks from the high ranked ones.

The logit regression based on the 2009 data indicates a positive relationship between bank ranking on the one hand and liquidity, profitability and costs ratios. However, the ranking is negatively associated with non-performing loans measures. The author argues that the positive sign of the cost variable coefficient indicates that banks that are better staffed and administered, outperforming their peers. The author highlights that the cost to income ratio in the GCC banking industry is low relative to the international average of 50%. The study contributes to the bank performance literature by examining the determinants of banking performance during the Global Financial Crisis.

4.2.2.2.3 Bank Market Concentration & Competition

This section is divided into three parts. The first discusses the studies solely concerned with market concentration in the banking sector. The second presents the papers associated with market competition in the banking industry. The third part reviews the studies that consider both market concentration and competition in the banking sector.

There are four studies that mainly consider market concentration in the GCC banking sectors. The first is that of Essayyad and Madani (2003) which studies the performance and concentration in the Saudi banking sector. The authors claim that increased market competition in the banking sector benefits both corporate and individual borrowers and investors. The paper utilises the data for ten banks to derive the HHI and the market concentration ratios for deposits and loans. In addition, it estimates a number of multiple regression models to measure the association between a bank's profitability on the one hand, and the proven oil reserves, oil prices, ratio of oil exports to total exports, and ratio of oil exports to GDP on the other.

The calculated concentration ratios and the HHI based on loans measures indicate high concentration levels in the Saudi banking sector. However, the correlation between banking sector development and concentration is negative. Furthermore, the paper finds

that over 50% of the variation in banks' profitability is explained by its positive relationship with oil prices and exports. The paper claims that increasing competition in the banking sector benefits both corporate and individual investors, and borrowers. The claim is not backed by any evidence from this paper or other studies that considered the banking sector in Saudi Arabia. Similarly, the policy recommendations, particularly the one related to joining the WTO, are broad and beyond the scope of the study.

The second paper concerned with market concentration is that of Al-Karasneh and Bolbol (2006) which analyses the implications of the banking sector market concentration on economic growth and corporate governance in the GCC region. The study is based on the data of 50 banks from the region for the 1995-2004 period. After calculating the concentration ratios and HHI, the authors estimate OLS regressions to assess the effect of market concentration on economic growth.

The OLS model's results indicate that the relationship between market concentration measures and economic growth is positive and statistically significant at the 10% level or less. In addition, the findings illustrate that the concentration measures promote economic growth up to a certain level of financial development after which the relationship turns negative. The authors estimate that with financial development (approximated by credit to the private sector as a percentage of GDP) readings of above 48%, the relationship between market concentration and economic growth is negative. The paper explains that the diseconomies of scale result in the higher cost of loans and lower economic growth. Although the study provides descriptive statistical analysis of the banking sectors in the GCC region, it fails to investigate the relationship between banking sector concentration and corporate governance empirically. The authors argue the significance of corporate governance for economic growth but fail to relate it to the research objective of their paper.

The study by Azzam and Rettab (2013) is another that considers the market concentration of the banking sector in the GCC. The authors estimate the effect of concentration on the margins of the GCC Islamic and conventional banks under the assumption of uncertainty. They include the data for 44 conventional banks and 20

Islamic banks. The paper uses the non-linear two-stage least squares and the non-linear three-stage least squares methods to estimate the structural models of the Islamic and conventional banks. The methods are selected to overcome the simultaneity and non-linearity of the margin equations. Further, the methods are consistent and asymptotically efficient.

The results show that the loan demand is inelastic for the Islamic as well as the conventional banks. The findings also suggest a positive relationship between the demand for loans and GDP for conventional banks. The paper illustrates that increasing Islamic loan concentration is welfare-neutral while increasing the conventional loan concentration is welfare-enhancing in the GCC region. The paper contributes to the development of the banking industry in the GCC literature by providing a theoretical and empirical framework to assess the market power, cost-efficiency, and risk effects of concentration on the loan and deposits intermediation margins. The limitations highlighted by the authors include the use of the conventional banks' interbank benchmark rates as proxy to those of Islamic banks, failure to differentiate between the different loan categories for conventional banks and financial instruments for Islamic banks, and short the sample period length.

The fourth study employs market concentration to evaluate the various market structure theories. In particular, Al-Muharrami and Matthews (2009) assess the Market Power Hypotheses, the Efficiency Structure Hypotheses and the Quiet Life Hypothesis in the GCC banking sector. The two Market Power Hypotheses assessed are the Structure Conduct Performance (SCP) and the Relative Market Power (RMP), while the two Efficiency Structure Hypotheses are the X-efficiency and the Scale Efficiency.

The SCP hypothesis argues that in a market with few firms and high entry barriers, prices are set to maximise joint profits via collusion, price leadership, and other tacit pricing arrangements. The RMP hypothesis, on the other hand, contends that only large firms with differentiated products can achieve abnormal profits and exercise market power. The model used to assess the SCP and the RMP hypotheses regresses income after tax to assets ratio on all the variables stated above. The X-efficiency theory states

that more efficient firms enjoy lower costs, higher profits and larger market shares due to their superior ability to minimise costs when producing any output. In contrast, the Scale Efficiency argues that firms have higher profits and larger market share due to scale efficiency that shifts the cost of the unit of production to the minimum average-cost point. To assess the Efficiency Structure Hypotheses, the paper runs a model where the dependent variable is the market share of the three largest banks, or market share of deposits, and all the other variables are the explanatory variables. Finally, the Quiet Life Hypothesis states that higher concentration and market share result in efficiency losses. Accordingly, the authors regress the efficiency variables on all the other measures to instigate the validity of this theory in the GCC banking sector.

The results show that the concentration ratio is statistically significant while the market share is not, which provides support to the SCP hypothesis over the RMP hypothesis. This is while findings associated with the Quiet Life Hypothesis model provide weak support to the theory. The findings illustrate that the relationship is negative between concentration and technical efficiency but is not statistically significant. The authors contribute to the literature by investigating the market power and efficiency theories in the context of the GCC countries.

The research papers that completely concentrate on the competition in the banking sector are those of Murjan and Ruza (2002), Ariss (2009), and Anzoategui et al. (2010). Murjan and Ruza look into the nature of the banking sectors in the Arab countries in the 1990s and find that banks in the GCC operate under monopolistic competition market conditions. The authors use the H-statistic approach and estimate two regression models for 141 banks from the six GCC States as well as Egypt, Jordan and Tunisia. Both models regress the gross interest revenue on other bank financial variables.

The results highlight that the H-statistic is notably higher for the for the non-oil producing countries than in the GCC States. Murjan and Ruza (2002) contend that the early deregulation of the banking sectors in the non-oil producing countries fostered competition. The full pooled sample regression model suggests that the total assets of banks are positively linked to their gross interest revenue while equity and Islamic

banks are inversely related to the gross interest margin. Although the authors argue that the study contributes to policy making in the Arab countries by highlighting the nature of the banking sector competition in those countries, the research conclusions are solely based on the H-statistic model. To ensure the robustness of the results, more than one approach should be considered when assessing the market competition.

Similarly to Murjan and Ruza (2002), Ariss (2009) focuses on the MENA countries and investigates the level of market power in the banking sectors of the studied countries. The paper includes all the GCC member countries along with Algeria, Jordan, Lebanon, Morocco, Tunisia and Turkey. The author measures the level of competition in each country and across the selected countries by calculating the H-statistic. In addition, the paper explores the factors behind the differences in the degree of competition by estimating a regression model.

The findings associated with the GCC countries indicate that the banks in the five countries operate in a monopolistic competition environment while the banks in Bahrain face perfect competition market conditions. The paper contributes to the literature on market structure of the MENA banking systems by utilising a larger sample of 205 commercial banks for the period between 2000 and 2006. The results of the research, however, can be confirmed by including other measures of competition.

In contrast to the other two studies of market completion discussed thus far, Anzoategui et al. (2010) examine bank competition in the MENA region and compare it to other regions. The paper also considers the factors contributing to the differences in bank competition between the MENA and other regions. The data included are for 250 banks from 12 MENA countries (including all the GCC member countries) and 7,785 banks operating in 122 countries in other developing regions. In addition to the use of the H-statistic as a measure of competition, the authors employ the Learner index. This index is derived by using the price of banking output and the marginal cost. The index ranges from 0 to 1 with 1 indicating a high market power and 0 corresponding to a low market power. Furthermore, the paper estimates cross-country regressions to assess the factors behind the differences in competition levels.

The findings for the GCC countries indicate that the level of bank competition is lower in the region compared to the other MENA countries and other developing regions. The regression analyses indicate that the credit information environment and the ease of entry into the banking sector explain the differences in the level of competition among countries. The study adds to the GCC's bank competition literature by comparing the results to those of other regions.

In the banking literature, there are a number of research papers that investigate both market concentration and competition. The first is by Al-Muharrami (2008) which examines and investigates the market structure of the banking sector in Kuwait and evaluates the banks' monopoly power between 1993 and 2002. The author argues that the banking industry in Kuwait is relatively protected due to barriers facing new entrants. The paper utilises the *k*-bank concentration ratio, the HHI, and the H-statistic model.

Based on the two and the three largest bank concentration ratios, the paper finds an increasing trend in the market concentration between 1993 and 2002. The HHI, however, decreased from 1950 to 1897 suggesting that the Kuwaiti banks operate in an "unconcentrated market" according to the author. The last model results indicate that the H-statistic is statistically significant and is equal to 1. This implies that the banks in Kuwait operate in a perfectly competitive market. Al-Muharrami (2008) provides background information for the reader about the development of the banking sector in Kuwait. The research can be extended to include a longer sample, particularly as the difference between the paper's year of publication and last data in the sample is six years.

Similarly, Al-Muharrami (2009) assesses the market structure and level of competition in the banking sector of Saudi Arabia. The paper studies the level of competition of ten commercial banks using two techniques. The first is the "non-structural model" developed by Panzar and Rosse (1987), which is also referred to as the H-statistic. The approach determines the banks' competitive behaviour based on the competitive static

properties of the reduced-form revenue equations that employ cross-section data. The second approach is based on the *k*-bank concentration ratio where the market shares of the k largest banks are summed. In addition, Al-Muharrami (2009) uses the HHI as an alternative measure of market concentration.

The results of the first approach show that the H-statistic is equal to 0.23, suggesting that the banks in Saudi Arabia earn their revenues under monopolistic competition conditions. The concentration ratios in deposits and loans illustrate downward trends in market share of the largest banks between 1993 and 2006. The HHI also suggests that the banking industry in Saudi Arabia is unconcentrated, both in the deposits and loans markets. One of the advantages of the paper is that it provides an account of the development of the banking industry in Saudi Arabia since the 1940s.

In the context of the GCC region as a whole, Al-Muharrami et al. (2006) analyse the banking sector market structure and monopoly power of banks between 1993 and 2002. The study uses data for 52 commercial banks from across the region to derive the *k*-bank concentration ratio, the HHI, and the H-statistic model.

The paper finds that, between 1995 and 2002, the 3-bank concentration ratio and the HHI values exhibited a decline in all the GCC countries except Oman. According to the US screening guidelines, Bahrain, Oman and Qatar markets are described as concentrated markets while Kuwait, Saudi Arabia and the UAE markets are described as moderately concentrated markets. The H-statistic approach results indicate that the GCC banking sector as a whole is operating under conditions of monopolistic competition. Assessed individually, the approach suggests that the Bahrain and Qatar markets operate in conditions of monopolistic competition while Kuwait, Saudi Arabia, and the UAE markets operate in conditions of perfect competition. The results for the Omani market cannot be determined.

The last study that examines market concentration and competition is conducted by Haskour et al. (2011). The research purported to assess whether market concentration was a key driver for market power in the GCC banking sector between 2002 and 2008.

In doing so, the authors employ the data for 52 banks from the GCC to calculate the concentration ratio and the HHI. In addition, the Lerner index is utilised to assess the level of competition in the market. The index is calculated as the difference between the price and marginal cost to price. An index value of zero indicates perfect competition while a value of one corresponds to perfect monopoly. Further, the authors employ three panel regression models to examine the determinants of market power.

The findings indicate that the level of market power in the GCC banking sector is high, as the mean Lerner index is 42% for the period 2002-2008. The index level, according to the authors, is higher than what has been observed in the developed countries as well as other developing countries, including the MENA countries. The panel regression analyses show that the relationship between market power and HHI is negative and statistically significant. The results illustrate that the relationship between market power and the concentration ratios is also negative. According to the authors, these results are inconsistent with the intuitive hypothesis that more market concentration leads to greater market power. The paper concludes that, given the negative relationship between market power and concentration, policy makers should encourage the consolidation of the banking system.

4.2.2.2.4 Other Banking Sector Studies

The studies included in the review include publications that consider various topics related to the banking sector in the GCC individual member states as well as the whole region. The first three studies discussed are those of Darrat et al. (2005), Aly and Kandil (2006) and Trablesi et al. (2014), and are all associated with the banking sector and the business cycle.

Darrat et al. (2005) enquire about the relationship between the financial sector development and the severity of the business cycle in the UAE economy. They claim that financial development can influence the fluctuations in the business cycle in the UAE. Financial development is approximated by the ratio of money supply M2 to nominal GDP, the ratio of demand deposit to the narrow money supply, and credit to the private sector as a percentage of GDP. This is while the moving average standard deviation of the GDP is used to capture the volatility in economic output. Darrat et al.

(2005) conduct unit root and cointegration tests to examine the stationarity of the data and the potential relationships among the variables. The ECM is than utilised to investigate the direction of causality between the variables.

The findings suggest a long-term relationship exists between financial development and economic growth volatility in the UAE. The ECM results also show that financial development has no significant effect on growth volatility in the short-term. The authors conclude that their findings show that financial reforms are valuable for promoting economic stability but only if these reforms persist over an extended time period. It is unclear, however, how the authors conclude that financial development mitigates economic growth volatility over the long-term. Providing evidence of a long-term relationship between the two variables is insufficient to conclude that financial development results in macroeconomic stability.

Comparable results are reported by Aly and Kandil (2006). Investigating the relationship between financial development and the fluctuation in the business cycle of the GCC countries, the study finds that the banking sector development reduces the volatility in economic growth of the GCC economies in the long-term. The authors study the period from 1973 to 2005 and consider the same three financial development measures suggested by Darrat et al. (2005). The paper employs the Johansen cointegration test and the ECM to evaluate the existence of long-term relationships and the direction of causality between the variables.

Aly and Kandil (2006) find that all three financial development measures are cointegrated with economic growth volatility. Further, the ECM findings indicate that all three financial development measures, inflation volatility and oil price volatility have an impact on economic growth volatility in the GCC region over the short-term. The study adds to the financial development and business cycle literature by providing evidence from the GCC region.

The last banking sector paper that is linked to the business cycle is that of Trabelsi et al. (2014). Their study evaluates the relationship between the banks' capital buffers and the

business cycle in the GCC countries. The data sample consists of 70 national and foreign banks operating in the region for the period 2004-2011. The authors employ the GMM estimator, regressing the bank capital buffer on its lagged value, ROAE, loans growth rate, the liquidity measure, the size measure, and crisis and country dummy variables.

The GMM regression results illustrate that economic growth and bank size are negatively related to the bank capital buffer. Furthermore, the results suggest that larger banks hold lower capital buffers during economic booms. Trabelsi et al. (2014) explain that the finding reflects the higher government ownership, access to public funding, and access to equity market of larger banks in comparison to smaller banks. Banks with higher liquidity are also found to hold fewer capital buffers during boom times and more during busts. The paper contributes to the bank capital and business cycle literature by providing evidence from the region.

Other studies consider the banking sector in relation to a number of topics including the banking sector environment (At-Twaijri, 1991), the politics of banking sector reforms (Boone & Henry, 2004), the effect of government ownership, disclosure, regulation and competition on bank performance and stability (Al-Khouri, 2013), the effect of corporate governance and activity diversification on bank valuation (Chahine, 2007), strategic orientation (Mahasneh, 2004), bank discipline (Omet et al., 2008), intellectual capital performance (Al-Musalli & Ismail, 2012), and bank service quality (Jabnoun & Al-Tamimi, 2003).

At-Twaijri's (1991) work is one of the early studies of the Saudi banking sector. In this paper, the author assesses the environmental factors that affect the banking sector in Saudi Arabia with the aim of measuring the importance levels of the external factors for commercial bank strategies and investigating whether the environment is analysed to determine opportunities and threats. The research is based on a survey completed by 103 banking professionals from six Saudi banks. The survey requires the participants to rank the competition, culture, demography, economy, government (regulation), and technology according to their importance for their bank's strategy. The survey also asks

about the banks' expectations of the current recession, use of environmental analysis, following competitors' moves, clarity of future banking prospects, and compromise strategies due to the lack of information on the Saudi financial market.

The results show that banks rank the environment factors from the most important to the least important in the following order: the economy, government (regulation), technology, competition, culture, and demography. In addition, the paper finds that banks assess the environment when setting strategies. At-Twaijri (1991) suggests that the paper fills the gap in the literature by examining the environmental factors influencing the banking sector in Saudi Arabia. The study, however, does not answer the second research question about whether the banks analyse the environmental factors to determine opportunities and threats.

In a paper that employs both empirical and case study methods, Boone and Henry (2004) analyse the politics of banking reforms in the MENA and SSA in the 1980s and 1990s. The authors claim that different banking reform paths across nations in those regions can be explained by the relationship between the government and private capital in the financial sector. The study divides the countries into four groups based on the level of government ownership, the deposit concentration, and the banking development. The first group is referred to as the "statist systems" which have high levels of banking sector concentration and government ownership. The second group is the "government-dominated system" and includes the countries with low banking system concentration and high government ownership. The third is "oligopolistic systems" where the countries exhibit high levels of banking sector concentration but low government ownership. The final group is called the "more competitive private-sector dominated system" and includes countries with low levels of banking sector concentrations and government ownership.

Boone and Henry (2004) suggest that the GCC countries fall within the oligopolistic systems group. To investigate this group, the authors employ the case studies of Jordan, Morocco, Cote d'Ivoire, and Senegal. They contend that the commercial banking oligopolies have developed in close relationship with the State. In the MENA

monarchies, the paper suggests that the indigenous commercial elite survived the colonial era along with the ruling elite and developed together political and economic ties that explain the close relationship between the government and private capital. The cases show that financial sector liberalisation is used to shore up the private sector oligopolies. The study contributes to the political economy literature, the banking sector reform literature, and to the knowledge about the MENA and SSA regions. The empirical evidence in this paper, however, is limited to financial ratios and indices. The use of more advanced empirical techniques could improve the quality of the results.

Another research paper that takes into account the level of government ownership in the banking sector is that of Al-Khouri (2013). The study examines the effects of government ownership, disclosure, regulation, and competition on the performance and stability of banks in the GCC region. Al-Khouri uses the data for all the 59 listed banks in the GCC's stock exchanges for the period from 2004 to 2010. The GLS and GMM methods are utilised to regress the z-score, ROA, and ROE on the government ownership, disclosure index, regulation index, bank concentration, and controlling variables.

The preliminary statistical analysis highlights that the government and quasi-government ownership in 2007 was 41% in the UAE (including 10% ruling family ownership), 35% in Saudi Arabia, and 13% in Kuwait. In the same year, the level of bank concentration was 67% for Qatar, 66.5% for Oman, 63% for Kuwait, 45.5% for Saudi Arabia, 40.5% for Bahrain, and 32% for the UAE. The GLS and GMM results suggest that government ownership is positively associated with bank stability in the GCC. This is while there is limited evidence on a negative relationship between the government ownership and bank performance. Although the paper considers all the listed banks in the GCC, the sample is limited to the period between 2004 and 2010 – a period overshadowed by the Global Financial Crisis. Accordingly, the results are influenced by this event and an extended study period that captures a full business cycle or more is preferred.

Chahine (2007) studies the effects of corporate governance and activity diversifications on the market valuation of the GCC region commercial banks. The findings illustrate that the commercial banks with diversified activities have higher market valuation in the GCC region. Furthermore, the foreign bank and corporate ownerships are positive for banks' valuation while domestic corporate ownership is negative. Greater activity diversification and board size are found to be negative for market valuation. The results indicate that a larger board of directors leads to more activity diversification for the region's commercial banks.

The findings are based on the results of 11 OLS and 2SLS regressions in which the market valuation and activity diversifications indices are set as the dependent variables while the ownership and controlling variables are set as the independent variables. The data included in the paper are for 41 listed commercial banks across the GCC for the period between 2002 and 2004. Chahine (2007) argues that the paper contributes to the debate on the importance of corporate governance in monitoring and adding resource capabilities in developing countries.

Focusing on the UAE, Mahasneh (2004) empirically investigates the strategic orientation of managers in the banking sector. The study considers this orientation in terms of customer focus, competition and strategy implementation. The author utilises a questionnaire completed by 250 banking and finance managers from across the UAE banks and finance firms. The responses are measured on a scale of one to five and then tested using t-test analysis for whether the mean response is greater than three.

The results indicate that banking and finance managers adopt a strategic orientation in relation to customer focus but the evidence is weak as almost half of the questions are below three. Further, the results suggest that banking and finance managers fail to analyse competition and are ineffective in implementing strategic decisions. The results, in relation to banks' and finance firms' analysis of competition and effective implementation of strategy, however, are based on five and four questions respectively. Increasing the number of questions can change the results of the paper.

Omet et al. (2008) investigate whether depositors discipline banks operating in the Middle East and the effect of deposit insurance policies on that discipline. The research considers 30 local banks from Jordan, Kuwait, Oman, and Saudi Arabia and adopts the period SUR / pooled estimated generalised least squares (EGLS) method. It is argued that the method is correct for arbitrary period serial correlation and period heteroskedasticity between residuals for a given cross-section. The study regresses the deposit growth and interest expense variables on capital adequacy, asset quality, management quality, earnings capacity, bank liquidity, the dummy variable, and the macroeconomic variables.

The results associated with the three GCC countries show that the deposit insurance policy does not affect the level of deposits supplied to banks. In addition, bank discipline is absent in the three countries, evidenced by the clients willingness to supply funds to banks with higher loans to total assets (riskier banks) and with lower capital adequacy ratios. The depositors also supply more funds to the more liquid and more profitable banks. The authors state that the paper is the first to investigate the bank discipline in the MENA region and thus contributes to the development of the literature.

Al-Musalli and Ismail (2012) assess the level of intellectual capital (IC) performance of the listed banks in the GCC and examine the effect of corporate governance, bank characteristics, and banking industry characteristics on its performance. The study is based on 74 listed banks from the GCC region, excluding Kuwait. The paper measures the IC performance, employing the value added intellectual coefficient (VAIC) method. The VAIC is derived from the sum of value added efficiency of the capital employed, the value added efficiency of the human capital, and the value added efficiency of the structural capital. The authors run five OLS regressions to test 11 hypotheses.

The findings show that the presence of foreign banks leads to deterioration in the IC performance of local banks, whereas the adherence to Islamic Sharia and banks' z-score is positively associated with IC performance. In addition, the positive relationship between the level of banking industry concentration and IC performance lends support to the Efficiency Structure Hypothesis. One of the strengths of the study is the use of

different explanatory variables based on the current literature on IC performance. However, the sample data that cover the period from 2008 to 2010 are short and the results are based solely on OLS models.

The final paper in this section is that of Jabnoun and Al-Tamimi (2003). The study explores the service quality dimensions in the UAE commercial banks and their validity and reliability. Further, it assesses whether the dimensions contribute equally to the overall service quality. The study is based on a questionnaire completed by 462 customers of commercial banks in Abu Dhabi, Dubai, and Sharjah. The questionnaire consists of 30 questions, which correspond to five service quality dimensions: reliability, responsiveness, tangibles, assurance, and empathy. The study applies factor analysis to the 30 items (questions) to examine the dimensionality of the instruments. The resulting factors are then analysed using correlation and regression analyses to test their validity and reliability. Finally, the authors employ regression analysis to compare the significance of the resulting dimensions.

The results indicate that the human skills dimension is the most important service quality dimension in the UAE banking sector. Other significant dimensions are tangibles and empathy. The authors recommend that banks should focus on human skills to improve the overall service quality. The paper illustrates the authors' detailed knowledge about the service quality literature, particularly in the context of the banking sector. The study, however, does not provide a summary of the survey responses.

4.2.2.3 Findings Synthesis

This section synthesises the findings of the reviewed studies. The similarities and differences in the countries studied, methods employed and research findings are discussed here. First, studies associated with the bank efficiency and productivity are considered. Then, research related to bank profitability and productivity is examined. This is followed by a discussion of the papers linked to the market concentration and competition in the banking sector. Finally, papers covering other topics are also considered.

The research studies investigating the efficiency of the banking sector in the UAE indicate that the efficiency levels have changed over the last two decades. Al-Tamimi and Lootah (2007) show that both operational and profitability efficiency improved between 1999 and 2003. Tai (2012), however, finds that efficiency levels deteriorated during the 2003-2011 period. Other findings related to the UAE show that the level of efficiency between 1990 and 2004 is lower than other countries in the region, as well as the developed countries, due to allocative inefficiency rather than technical inefficiency (Aly et al., 2006).

In the case of Bahrain, bank efficiency improved between 1998 and 2000 (Hassan et al., 2004). Compared to Kuwait, the UAE and Qatar, the overall technical efficiency of Bahraini banks is higher (Grigorian & Manole, 2005). Furthermore, the profit and cost efficiency levels were higher in Bahrain than in Saudi Arabia during the 1992-2000 period (Al-Jarrah & Molyneux, 2007).

Research studies examining the GCC region demonstrate that bank efficiency was constant between 2000 and 2004 (Ramanathan, 2007) but increased between 1999 and 2007 (Srairi, 2009a). The determinants of bank efficiency in the region include a number of variables. The number of branches and percentages of female employees are positively associated with bank efficiency in the UAE. This is while age of the bank, number of employees, number of employees with short work experience, and the percentage of national employees are negative for the levels of efficiency in the UAE (Aly et al., 2006). Bank size, bank capital and ROA are positively associated with efficiency in Bahrain but market power is negatively related to the overall efficiency (Hassan et al., 2004). Similarly, ROA and the equity to total assets ratio improve the levels of efficiency in the GCC as a region. However, the bank size and operational costs are negative for cost efficiency (Srairi, 2009a).

As a percentage of all the studies that assess the bank efficiency in the GCC, 70% employ the DEA method. Despite the method being identical, it is worthwhile noticing that the input and output variables differ from one study to another. Other methods used are the stochastic frontier method (20%) and the distribution-free approach (10%). In

terms of the countries studied, four out of the ten studies examining bank efficiency focus on the UAE while two papers consider the banking sector in Bahrain.

In 80% of the research conducted to explore the level of productivity in the GCC banking sectors, the findings suggest that productivity was constant or declined in the 1990s and the early 2000s (Al-Muharrami, 2007; Ariss et al., 2007; Ramanathan, 2007; Srairi, 2011a). The rate of growth in productivity increased rapidly in the region between 2003 and 2007 (Srairi, 2011a). The decline in bank productivity is due to technological regression in most GCC countries as well as to the fall in the overall technical efficiency in Kuwait, Oman and Qatar (Al-Muharrami, 2007; Ariss et al., 2007; Ramanathan, 2007). Srairi (2011a) associates the growth in bank productivity with the financial liberalisation of the early 2000s. In addition, he finds that the money supply, GDP per capita growth, and financial development variables are positively associated with bank productivity in the region.

The method employed to study productivity in the GCC banking sectors in all the research publications reviewed is the Malmquist index approach. In 80% of the reviewed studies, the GCC as a whole is considered. Only one study concentrates on bank productivity in Kuwait.

In eight of the 13 studies considering the profitability and performance of the GCC's banks, the researchers investigate the determinants of bank profitability and performance. Excluding two studies that focus on the effect of the banks' board of directors and market orientation, 50% of the remaining studies that examine the bank profitability and performance determinants show that the former is positively associated with liquidity (Al-Hares et al., 2013; Al-Tamimi, 2010; Murthy, 2013) as well as ROA (Masood et al., 2009; Rettab et al., 2010; Srairi, 2009b). This is while 33% of the studies suggest that market concentration (Al-Tamimi, 2010; Srairi, 2009b) and bank efficiency (Poghosyan & Hesse, 2009; Rettab et al., 2010) are positive for bank profitability.

In two studies that assess the bank profitability and performance of the GCC countries within the context of the MENA region, the authors find that the GCC banking sectors are more efficient and profitable than their counterparts in the other MENA countries (Ben Naceur & Omran, 2011; Olson & Zoubi, 2011).

The number of studies that consider bank profitability and performance in at least five GCC Member States is seven, in the UAE only it is three, and in Saudi Arabia exclusively it is two. In terms of the methods adopted by the bank profitability and performance papers, multiple OLS regression analysis is present in five studies while the GMM method is used in two.

Evidence from research papers that examined the market concentration and competition in the banking sector indicate that the GCC banks operate under a monopolistic competition market environment (Al-Muharrami, 2009; Al-Muharrami et al., 2006; Ariss, 2009; Murjan & Ruza, 2002). Out of the five studies that consider the competitiveness environment in the GCC banking sectors, 80% point to monopolistic competition and 20% to perfect competition. The latter result is associated with Al-Muharrami (2008) who is solely dedicated to studying the Kuwaiti banking sector.

The studies that track the change in the market concentration levels indicate that in most of the GCC countries the concentration of the banking sector declined between 1993 and 2002 (Al-Muharrami, 2009; Al-Muharrami et al., 2006). Kuwait is an exception where the market concentration levels of its banking sector increased during this period (Al-Muharrami, 2008). Furthermore, out of the three papers that consider the banking sector's market concentration and competition of the GCC countries in the context of the larger MENA region, two studies highlight that the level of competition is lower in the GCC banking sectors than in those of the other MENA countries (Martinez Pería et al., 2010; Murjan & Ruza, 2002).

Out of all the 11 research papers that assess the level of market concentration and competition in the GCC, eight studies consider all the GCC Member States, two focus on Saudi Arabia, and one is exclusively dedicated to Kuwait. Method-wise, all these 11

studies use regression analyses, while 55% of the studies employ the H-statistic method and 45% calculate the HHI.

The last group of studies, which consists of papers covering various topics in relation to the banking sector in the region, provides a diversity of findings. Two papers, however, provide similar findings linked to the relationship between financial development and economic growth volatility. The studies establish that a long-term relationship exists between banking sector development and economic growth volatility in the GCC countries.

As percentages of the 11 studies in this group, 55% of the papers are concerned with the GCC region as a whole, while 27% cover the banking sector in the UAE. Regarding the methods utilised by the studies, three papers employ the multiple OLS regression analysis, two use the GMM method, and two are based on the ECMs.

4.2.3 Evaluation of Findings

This section intends to assess the findings of the reviewed studies in relation to the question "What are the characteristics of the banking sector in the GCC?" The four groups of studies are discussed in the same sequence as in the previous section. This is followed by a summary of the banking sector characteristics based on the assessed research evidence.

The current literature suggests that efficiency in the GCC banking sector has experienced a declining trend. As a percentage of the studies considering the change in bank efficiency in the region, 67% report a fall in efficiency levels in most of the countries over the last two decades (Al-Muharrami, 2007; Aly et al., 2006; Darrat et al., 2002; Tai, 2012). Although bank efficiency research papers employ the same DEA method in examining the change measure over the studied period, the input and output variables used in the method differ from one research to another. For instance, Darrat et al. (2002) include the number of all employees in the bank, book value of fixed assets and premises, the sum of demand and saving deposits as input measures, while the sum of all types of loans and the sum of all investment securities, other than those held for

trading, are used as the output variables in the DEA model. Al-Tamimi and Lootah (2007), in contrast, include the employees' expenses and other expenses as input variables and the total loans, total deposits, and number of transactions as the output variables.

In terms of the determinants of bank efficiency, two out of the three studies find ROA to be positively associated with bank efficiency in the region (Hassan et al., 2004; Srairi, 2009a). The other bank efficiency determining factors reported by the studies are different. In one case the results from the two papers are contradictory. Hassan et al. (2004) find that bank size is positively associated with bank efficiency in the case of Bahrain while Srairi (2009a) concludes that the relationship between the two variables is negative.

Bank productivity in the region exhibited a shift from a constant or declining trend in the 1990s and early 2000s to a rapid growth trend thereafter. The first period of evidence is based on the results of 80% of the five studies that investigated bank productivity in the GCC. The second period is based on the work of Srairi (2011a). The latter is the only paper considering bank productivity in the GCC during this period. All the papers, however, employ the Malmquist index approach. Accordingly and despite the consistent evidence, the results should be treated cautiously as they are all based on the same method. Other methods for measuring bank productivity are needed to verify the literature findings.

The studies that investigate the determinants of bank profitability suggest that liquidity and ROA are positive factors for bank profitability. The evidence is consistent with the practice where high levels of liquidity drive the funding costs of the bank down and subsequently enhance profitability. Similarly, high ROA—as a result of greater market power that enables the bank to maintain larger net interest margin spreads than those under a more competitive market environment—also led to increased bank profitability. A high ROA due to greater risk-taking activities can produce lower profits for the bank as a result of increased credit defaults.

However, evidence indicates a positive association between market concentration and bank efficiency, on the one hand, while bank profitability, on the other hand, is weaker. Out of the six studies that assess the bank profitability determinants, only two studies report market concentration and bank efficiency as positive factors. Although the results are in line with the practice in the banking industry, where market power enables the bank to increase the intermediation spreads, increasing the bank's profits, and efficiency in converting deposits into loans improves the bank's net income, further research is required to confirm the results for the GCC banks.

In both of the studies that compared the profitability and performance of the GCC banks to those of the MENA, the authors suggest that the GCC banks are more efficient and profitable. Each research investigates a different data period but both focus on mostly the same countries. Out of the ten countries each paper studied, nine countries in both papers are the same. Confirming the findings requires comparing the efficiency and profitability of the GCC banks with other MENA countries.

The research concerned with market concentration and competition reports that the GCC banks operates under a monopolistic competition environment. The results are based on the H-statistic approach. However, authors employ data for different periods and number of individual countries, as well as for the GCC as a region. In 67% of the research exploring trends in market concentration levels, authors find a declining tendency in the region between 1993 and 2002 (Al-Muharrami, 2009; Al-Muharrami et al., 2006). As the studies consider the same period, further evidence is needed to establish whether the findings indicate a trend that persists to the current date or if it is a unique experience associated with that specific period. Similarly, 67% of the research related to the GCC banking sector market concentration and competition within the context of the MENA area demonstrates that the banking sectors in the six countries are less competitive (Martinez Pería et al., 2010; Murjan & Ruza, 2002). Each paper explores different MENA countries during different periods in time.

Finally, two studies suggest that the financial development and economic growth volatility in the region are linked. The papers use similar data sample periods (i.e. 1973-

2000 and 1973-2005) and identical time series models. Darrat et al. (2005) focus on the UAE while Aly and Kandil (2006) study all six GCC member countries. Affirming such a relationship requires adopting different measures of financial development and economic growth as well as different models.

The findings of the current literature in relation to the review question are summarised in the following points. First, research evidence shows that bank efficiency has been declining over the last two decades in most of the GCC States. Scholars also find that ROA is positively linked to bank efficiency in the region. Furthermore, the GCC bank productivity exhibited a shift from a declining trend to a rapid growth over the last decade. Two of the bank profitability determinants are liquidity and ROA. In addition, the literature illustrates that the GCC's banks operate in a monopolistic competition environment. Lastly, the market concentration experienced a declining tendency across the region between 1993 and 2002.

4.2.4 Discussion & Further Research

After highlighting the findings of the reviewed papers, this section focuses on the areas for further research. First, the section discusses the potential research topics based on the findings of the reviewed studies. Then the section underlines the areas for further research as suggested by the literature.

The review of the literature demonstrates that the majority of the studies concerned with bank efficiency in the region adopt the DEA model. The use of different approaches, such as the stochastic frontier method and the distribution free method, can provide more rigorous evidence regarding the change in bank efficiency over different periods and in relation to the determinants of bank efficiency in the GCC. Furthermore, change in bank efficiency levels in the region need to be compared to those of other regions to understand the pace of the banking sector development in the GCC.

In the current literature, most of the bank efficiency determinant factors are bank-level variables. Aly et al. (2006), for instance, test variables related to the education, gender, and nationality of the employees, number of branches, foreign transactions, share of

different loan types, and number of products offered as bank efficiency determinants. The authors fail to consider country-level variables related to specific GCC characteristics, such as the high dependency on the hydrocarbon industry and the large public sector. More research in relation to the effect of the specific dimensions of the GCC region on bank efficiency is required.

The review of the papers associated with bank productivity in the region show that all the studies in this area utilise the Malmquist index approach. Accordingly, confirming the findings of those studies requires adopting other research approaches. In addition, limited studies consider the factors behind the change in bank productivity in the region. Srairi (2011a) links the change in bank productivity to the banking sector liberalisation of the early 2000s. In the current literature, no other studies investigate this area.

As in the case of bank productivity research, all of the studies associated with market concentration and competition assess the GCC banking sector market environment using the H-statistic. Although most of the studies report consistent results, other methods ought to be considered to affirm the findings. In addition, the decline in the market concentration of the banking sector in the region between 1993 and 2002 can be compared to the change in the market concentration in other regions to establish whether the findings are specific to the region or if it is a global trend. Economic theory argues that market competition improves the allocation of resources within the economy. Understanding the relationship between market concentration and other economic variables such as economic growth is an area for further research. Furthermore, scholars should consider the determinants of market concentration in the GCC banking sector.

The studies considering the banking sector in the GCC countries within the broader MENA region show that the GCC banks are more efficient and profitable than their counterparts in the MENA region. In addition, the research demonstrates that GCC banks are less competitive than their counterparts in the larger MENA region. The two findings contradict the market economic theory, which argues that competition results in improving the allocation of resources and thus enhances the efficiency of firms. The

studies are showing that despite the relatively less competitive market environment, the GCC banks are more efficient than their counterparts in the MENA region. Those findings indicate that further research is required to understand the relationship between competition and efficiency in the GCC banking sector.

Another area for further research is the relationship between financial development and economic growth volatility. Two studies that employ the same research methodology report a long-term relationship between the two variables. To confirm the findings of the two studies, scholars are required to utilise other measures of financial development and economic growth than those employed in the studies. Other measures of financial development can be associated with financial access, depth, efficiency, and stability, while measures of economic growth can include the economic growth of the private sector and the non-hydrocarbon GDP growth. In addition, researchers interested in verifying the results of those studies ought to utilise other empirical methods than the ECMs.

Scholars also propose various areas for further research in the reviewed papers. The research studies appraising the efficiency of the banking sector in the UAE highlight a number of topics. Following their findings in relation to the effect of the number of branches, female employees, employees with short work experience, and national employees, on bank efficiency in the UAE, Aly et al. (2006) suggest investigating the results further to provide policy recommendations. Shahwan and Hassan (2013) recommend exploring the relationship between the banks' profitability and the social disclosure in the context of the UAE. The recommendation is based on the paper's results, which indicate that banks with high profitability tend to have high disclosure efficiency.

In the case of Grigorian and Manole (2005), the authors propose researching the exact types of inefficiency in the sector by examining the product mix and scope inefficiencies in Bahrain. In addition, the paper recommends considering macroeconomics, competition, ownership, and other institutional factors when assessing the efficiency of the banking sector in Bahrain. Finally, the authors suggest examining

the differences in the banking sectors across the GCC region. The last study related to bank efficiency is that of Srairi (2009a) which suggests that further research should consider the off-balance sheet items and risk management activities when estimating the efficiency levels, compare local banks to foreign banks, and compare State-owned banks to privately-owned banks.

Al-Saidi and Al-Shammari (2013) propose extending the research in the area of the relationship between board of directors composition and bank performance to other GCC countries as data become available. Further, they recommend considering the effect of executive and non-executive directors' ownership on the performance of banks. In another study related to bank performance, Al-Hares et al. (2013) propose researching the effect of bank size and the country on the banks' performance and the capital quality in the region. Another suggestion is to employ qualitative methods when investigating the management perception of the performance and capital quality in Islamic and conventional banks.

In a study of profitability and concentration in the banking sector, Essayyad and Madani (2003) suggest no further research but their study's findings point to the area of the relationship between the oil industry and bank profitability as a potential research topic. A further paper concerned with market concentration is that of Azzam and Rettab (2013). The authors propose applying their empirical framework to assess the effect of the Global Financial Crisis of 2008-2009 on the two types of bank. The last study in the area of market concentration and competition is by Haskour et al. (2011). Despite the paper not proposing any further research, its finding of a non-linear relationship between a bank's size and market power is another area for further research.

Aly and Kandil (2006) recommend researching the impact of the proposed GCC currency union on the business cycle, the level of financial integration between the six GCC countries, the possibility of pricing and selling oil in non-dollar dominated proceeds, and the optimal exchange rate regime for the proposed GCC's common currency. The findings of Darrat et al. (2005), however, indicate that further research is required to understand the direction of causality between financial development and

growth volatility, particularly in the light of the last Global Financial Crisis which demonstrated how excessive financial development can result in higher growth volatility.

Al-Khouri (2013) suggests using different measures of stability and performance, comparing risk-taking behaviour and performance in Islamic banks as against conventional banks, and the effect of government ownership on performance and risk taking during crises as topics for further research. Chahine (2007) recommends investigating whether the GCC commercial banks' access to more skilled human capital can change the relationship between diversification and market valuation. In addition, he proposes controlling for the cumulative effect of financial, strategic, and private investors on the market valuation of the GCC banks. Jabnoun and Al-Tamimi (2003) suggest addressing the impact of national culture on the perception of banks' service quality in future research. In addition, they propose examining the differences in service quality between local and foreign banks as well as between Islamic and conventional banks.

5 Discussion

In view of the SLR findings, this section discusses the motives behind conducting research in the area of banking sector development and economic growth. In doing so, the section identifies the research gaps in the literature and underlines the relevance of researching those areas for the development of the literature and for policymaking in the region. The two themes discussed here are the relationship magnitude between banking sector development and long-term economic growth in the GCC as a region, and economic diversification in relation to the banking sector development in the natural resource-rich economies.

5.1 Banking Development & Economic Growth Relationship

The SLR associated with the first review question shows that findings in relation to the link between banking sector development and long-term economic growth for the GCC as a single region is far from conclusive. On the basis of the undertaken review only two

studies are found to look into the finance-growth relationship in all the GCC countries. In particular, Hamdi et al. (2012) explore the relationship for the region as a whole whilst Chuah and Thai (2004) look at each GCC member country individually.

In both studies, the authors investigate the existence of a long-term relationship and the direction of causality between banking sector development and economic growth. The studies, however, overlook the extent to which one variable influences another. The authors fail to consider the size of the effect of change in the banking sector development on the long-term economic growth and vice versa. Policymakers are interested in knowing the effect of a 1% increase in the depth of the banking sector, for instance, on the long-term economic growth rate. Measuring such an effect is particularly relevant to governments considering encouraging the development of the banking sectors in their economies. Appreciating the effect's magnitude enables policymakers to assess the merits of allocating economic resources for the development of the banking sector for economic growth vis-à-vis other potential sectors.

5.2 Banking Development & Economic Diversification

Today one of the key economic objectives of the development plans and strategies of the GCC states is to diversify the economies away from the hydrocarbon sector. The aim is to attain a sustainable long-term economic growth and higher living standards for the people of the region. The issue of economic diversification has been placed at the forefront of economic policy in the region due to four factors: the demand for and price of those resources fluctuate considerably over time, hydrocarbon resources are finite, their revenues crowd out other economic activities, and those resources represent the only source of wealth for the region (Hvidt, 2013).

The high dependency on natural resources for government revenues and economic growth exposes countries to increased fluctuations in the governments' fiscal budget and the GDP. Volatility in the prices of natural resources, if not faced with strategies and policies that mitigate their effect, results in fluctuations in government revenues and economic growth. One of the policies that limit this issue is encouraging the development of other product and services sectors that are not highly correlated with the

natural resources in which the country is abundant. Compared to the situation in which the economy is solely dependent on natural resources, the development of unrelated economic sectors helps governments mitigate the drop in revenues and productivity during periods of low demand and prices for its natural resources.

Another issue in relation to the dependency on natural resources is that some of those resources are finite. Policymakers understand that their economies cannot depend on such resources indefinitely as at some point in the future those resources will be exhausted. This is particularly the case in the GCC countries where the natural resources are limited to crude oil and natural gas. Thus the governments' aim in the region is to develop economic sectors that are sustainable over the long-term.

In addition, the GCC's dependence on the hydrocarbon resources makes the region susceptible to what is referred to in the literature as the natural resource curse or Dutch disease. The natural resource curse refers to the phenomenon in which economies with oil, natural gas, valuable mineral deposits or resource wealth fail to grow faster than economies without such resources (Frankel, 2010). The natural resource curse is typically associated with the crowding-out effect of the natural resource industry on the development of other economic sectors, particularly manufacturing. The increased focus on the industry associated with the natural resource and the appreciation in the currency exchange rate value due to the strong demand for the natural resource exports deter the development of the other sectors in the economy.

Finally, the significance of the natural resources depends not only on the consumers' income level and preferences but also on the availability of alternative goods. This constitutes another concern for policymakers in the natural resource-based economies. The discoveries of alternative resources and advances in technology can make some natural resources redundant. For instance, developments in the technology used in producing solar energy in the future can reduce the world's dependency on a number of natural resources employed currently in generating energy. In countries with abundant natural resources, governments understand the risk posed by alternative resources and

new technology on the significance of their countries' natural resources. As such, more effort is put into diversifying the economy away from those natural resources.

The channels through which the banking sector development influence economic growth position the banking sector to play a greater role in stimulating growth in certain economic sectors and contribute to economic diversification. The intermediation function of the banking sector ensures that funds are relocated from regions and sectors with high levels of savings and/or low investment opportunities to regions and sectors with low savings levels and/or high investment potentials (Bagehot, 2009). The banking sector also supports entrepreneurs with innovative ideas by funding their risky projects (Schumpeter, 2012).

It is thus imperative for policymakers in countries that concentrate on diversifying their economy to understand the effect of banking sector development on the development of other economic sectors and economic diversification in general. The literature that considers the finance-growth relationship in the natural resource-rich countries overlooks the relationship between banking sector development and growth in the different economic sectors. In addition, research papers in this field fail to consider the potential relationship between development in the banking sector and economic diversification in the resource-based economies.

6 Further Research

In order to achieve the goal of attaining sustainable long-term economic growth and higher living standards for the people through diversification, the GCC States' governments are required to identify the sectors that can be developed to take a leading role in the future growth of those economies. A potential sector is the banking industry, as it is part of the greater financial sector, which represents the third largest economic sector in the GCC, and is underdeveloped in certain aspects when compared to its counterparts in countries with similar levels of income. The banking sector can potentially contribute to the growth of the other economic sectors and economic diversifications of the region.

Assessing the extent to which the banking sector development is associated with economic growth will enable policymakers in the region to decide on whether the sector has the prospects to stimulate long-term economic growth or not. Establishing a significant relationship between the two variables would encourage allocating more resources for the development of the banking sector in the region. The development of the banking sector not only requires investment in capital and human resources but also setting suitable legal and regulatory frameworks to ensure the sustainability of the sector. The presence of laws that protect depositors' and investors' interests as well as regulations that ensure the stability of the banking sector are crucial for the viability of the sector.

Scholars suggest that the banking sector contributes significantly to channelling funds between savers and borrowers. This function positions the banking sector to stimulate growth in other economic sectors by supporting new, innovative projects of entrepreneurs and long-term expansion plans of firms. Examining the nature of the relationship between banking sector development and growth in the different economic sectors in the natural resource-rich countries enables researchers as well as policymakers to appreciate the importance of the banking industry development for certain economic sectors, if any. Finding consistent relationships between banking sector development and the growth of given sectors in the natural resource-based economies adds to the development of the banking sector literature in this context. Taking into consideration the strategic plans set by a number of the natural resources dependent countries to establish and foster selected economic sectors and diversify their economies, exploring the relationships also provides officials in those countries with invaluable findings about the effect of developing their banking sectors on the other economic sectors. The policymakers accordingly can assess whether resources should be devoted to the development of the banking sector.

As in the case of the relationship between banking sector development and growth in the individual economic sectors in the natural resource-based economies, the literature can consider the relationship between the development of the banking sector and

economic diversification in economies with abundant natural resources. The crowding out effect of the natural resources on the development of the other economic sectors—due to higher investments in the industries related to the abundant natural resources—can potentially be offset by the development of an advanced banking sector that is capable of financing the other sectors in the country. For countries aiming at diversifying their economies, evaluating the effect of the financial intermediation development on the diversity of the economy is vital for policymakers.

Based on the earlier discussion, two questions are suggested for further research in the area of banking sector development and long-term economic growth in the GCC region:

- What is the extent to which the banking sector development is linked to long-term economic growth in the GCC region?
- What is the nature of the relationship between the banking sector development and economic diversification in the natural resource-based economies?

7 Conclusion

The GCC's governments are striving to diversify their economies away from the hydrocarbon sector. The dominance of the oil, natural gas, and petrochemical industries on the government revenues and economic growth expose the region's economy to increased volatility in its business cycle. Policymakers across the region also understand that this economic structure is unsustainable. Accordingly, the development of other economic sectors that could generate new employment opportunities, higher levels of income, and sustainable long-term economic growth is desirable. The underdeveloped banking sector in the region is one of the potential sectors for attaining higher long-term economic growth rates and diversifying the economy. The research findings from other countries and regions show that the banking sector promotes economic growth.

Using the SLR method, this paper reviews the finance-growth nexus literature in the context of the natural resource-based economies in general and the GCC region in particular to highlight the findings of the literature in relation to the review questions. The findings suggest a positive relationship between banking sector development and

long-term economic growth in the economies with abundant natural resources. For the GCC region, findings in relation to the relationship are inconclusive. The findings in relation to the direction of causality between banking sector development and economic growth in the resource-based economies are also far from conclusive. In the case of the region, however, the reviewed studies provide evidence of a bidirectional relationship between the two variables.

The literature review associated with the second review question shows that the banking sectors in the GCC countries are more efficient and profitable than their counterparts in the MENA region. Furthermore, the findings suggest that the banks in most of the GCC countries operate under monopolistic competition market environments but that market concentration declined in the banking industry across the region during periods in the last two decades.

The literature reviews propose two areas to be considered for further research. The first is related to studying the size of the effect of the banking sector development on long-term economic growth and vice versa. Investigating this relationship can contribute to the finance-growth nexus literature by offering evidence from the GCC region and provide policymakers with findings that can be employed to decide on the viability of dedicating resources for the development of the banking sector. In addition, the SLR findings indicate that the reviewed studies overlook the potential relationship between the development of the banking sector and the other economic sectors. Similarly, no study considers the effect of the banking sector development on economic diversification. Addressing those possible relationships is not only significant for the GCC countries but also for the natural resource-based economies. For policymakers, researching this area is valuable for understanding the significance of developing the banking sector for the growth of certain economic sectors and the diversification of the economy. Further, researching this area adds to the current banking sector literature by examining and providing evidence in relation to economic diversification.

Today the GCC countries face great economic challenges including the urgency to create new employment opportunities for the growing young population, finding

alternative sources for government revenues, increasing household income levels, diversifying their economies away from the hydrocarbon sector, and attaining sustainable long-term economic growth. At this stage, more research is required in the area of the banking sector in the context of the GCC as well as the other under-researched areas in economics and finance to enable policymakers to undertake decisions that are based on rigorous research and evidence. Such informed decisions will enable the countries in the region to overcome the economic challenges they are facing and realise a better future for the people of the region.

Project II

Banking Sector Depth & Economic Growth Nexus: A Comparison between the Natural Resource-Based & the Rest of the World's Countries

Abstract

This thesis investigates the relationship between banking sector depth and long-term economic growth in the Gulf Cooperation Council's States in comparison with the other world economies that are not dependent on natural resources. As a proxy for the GCC's States, the natural resource-based countries are considered in the research. The thesis utilises a database of 214 countries for the period from 1961 to 2013 and employs the Generalised Method of Moments (GMM) estimator for the dynamic panel data models to assess the finance-growth nexus in the natural resource-based countries and the rest of the world. Based on different measures of banking sector depth and economic growth, the investigation yields three key findings. First, the relationship between banking sector depth and economic growth in the natural resource-based countries as well as the rest of the world countries is non-linear and positive within certain levels of banking sector depth. Second, the time lag between the change in the level of banking sector depth and the effect on economic growth is shorter in the natural resource-based countries than in the other countries. Finally, the total effect of banking sector deepening on long-term economic growth is smaller in economies with abundant natural resources than in the rest of the world. The thesis suggests a number of areas for further research based on its findings.

1 Introduction

The Global Financial Crisis of 2008-2009 not only had an impact on the global financial system and economy but also research, particularly in the fields of Finance and Economics. The severity of the crisis and its devastating consequences for economies across the world prompted scholars to revisit the question of the relationship between financial development and economic growth. Research prior to the crisis generally provided evidence supporting the notion that the development of the financial sector stimulates long-term economic growth. More recent research, however, suggests that the relationship between banking sector depth and long-term economic growth is non-linear, as discussed in more detail below.

Despite the renewed interest in this area, research that assesses the finance-growth nexus in the context of the GCC States or the broader NRBC is limited. An SLR conducted prior to this thesis that considers the question of the link between banking sector development and the long-term economic growth in the GCC States, finds that research considering the finance-growth nexus in this region is scarce and remains inconclusive. Out of the 33 studies included in the SLR, only two papers solely examined the relationship in the context of the GCC; the first is that of Chuah and Thai (2004) and the second is by Hamdi et al. (2012).

In both studies, the authors investigate the existence of a long-term relationship between banking sector development and economic growth. The studies, however, overlook the extent to which one variable influences the other. The authors fail to consider the size of the effect of change in the banking sector development on the long-term economic growth and vice versa. Policymakers are interested in knowing the effect of a 1% increase in the depth of the banking sector, for instance, on the long-term economic growth rate. Measuring such an effect is particularly relevant to governments considering the potential economic benefits of adopting policies that encourage the development of the banking sectors. Appreciating the effect's magnitude enables policymakers to assess the merits of allocating economic resources for the development of the banking sector for economic growth vis-à-vis other potential sectors.

Across the GCC region, governments place the issue of economic diversification at the forefront of their economic policies and strategies. This reflects governments' goals of achieving a sustainable, long-term economic growth and higher living standards for the people of the region. The relatively high dependency on the sectors associated with oil and natural gas exposes the GCC to a number of economic challenges. Firstly, it increases the volatility of the economic activities in those countries. The fluctuations in the international demand for crude oil and natural gas, and subsequently their prices, increase the volatility in the government revenues and economic growth levels due to their high dependency on those resources. Secondly, the natural resources are finite. Accordingly, the GCC's governments cannot depend on those resources indefinitely.

Thirdly, the high dependency on natural resources makes the region susceptible to the natural resource curse or Dutch disease. The natural resource curse refers to the phenomenon in which economies with oil, natural gas, valuable mineral deposits or resource wealth fail to grow faster than economies without such resources (Frankel, 2010). Finally, the value of the natural resources partially depends on the availability of alternative goods. The discovery of alternative resources and advances in technology could make some natural resources redundant.

A sector that can potentially contribute to the long-term economic growth of the region is the banking industry. As part of the greater financial sector, which represents the third largest economic sector in the GCC, the banking sector is underdeveloped in certain aspects when compared with its counterparts in countries with similar levels of income. Scholars suggest that the banking sector contributes significantly to channelling funds between savers and borrowers. The intermediation function of the banking sector ensures that funds are relocated from regions and sectors with high levels of savings and/or low investment opportunities to regions and sectors with low savings levels and/or high investment potential (Bagehot, 2009). The banking sector also supports entrepreneurs with innovative ideas by funding their risky projects (Schumpeter, 2012). This function allows the banking sector to stimulate growth in other economic sectors by supporting new, innovative projects of entrepreneurs and long-term expansion plans of firms.

Accordingly, this thesis intends to investigate the extent to which the banking sector depth is linked to long-term economic growth in the GCC States in comparison with the other countries that are not dependent on natural resources. The NRBC is used as a proxy for the GCC States due to data limitations discussed below. In this investigation, three relationship dimensions are considered. The first is the type of relationship, the second is the time lag between the change in the banking sector depth and its effect on economic growth, while the third is the relationship magnitude. The thesis employs a database of 214 countries for the period from 1961 to 2013 and estimates the relationships in dynamic panel data models using a GMM estimator for the NRBC and the rest of the world countries.

The research contributes to the development of the finance-growth nexus literature as well as to economic policy in the GCC region. As highlighted earlier, the studies considering the relationship between the banking sector development and long-term economic growth in the GCC region are limited and only concerned with the existence and direction of causal relationships between the variables in those countries. Investigating the three dimensions of the relationship between banking sector depth and economic growth contributes to the development of the literature on the region. Researching this area in the context of the natural resource-rich economies and the GCC in particular can add to the finance-growth nexus literature by introducing new areas of research.

The research can contribute to economic policy by providing research evidence in relation to the link between the development of the banking sector and long-term economic growth in the GCC area. Assessing the type and scale of the relationship between the banking sector depth and long-term economic growth enables policymakers to evaluate the relevance of the banking sector for their economies. A positive and significant relationship, for instance, would encourage policymakers to devote more resources to the development of the banking sector in the region.

The structure of the chapter is as follows. The next section provides a brief literature review of the different empirical research methods employed in the finance-growth nexus literature. The third section introduces the data and variables utilised in this research by discussing their sources and definitions, and providing descriptive statistics of the banking sector measures for the different country groups considered here. This is followed by a section that presents the GMM estimators, highlights the research process, and discusses the research reliability and validity. The fifth section reports and synthesises the results associated with the selected models, while the sixth discusses the results and their implications for the literature and policy. Then the thesis turns to further research before concluding with a summary of the research and closing remarks. Figure 8 provides the structure of the research.

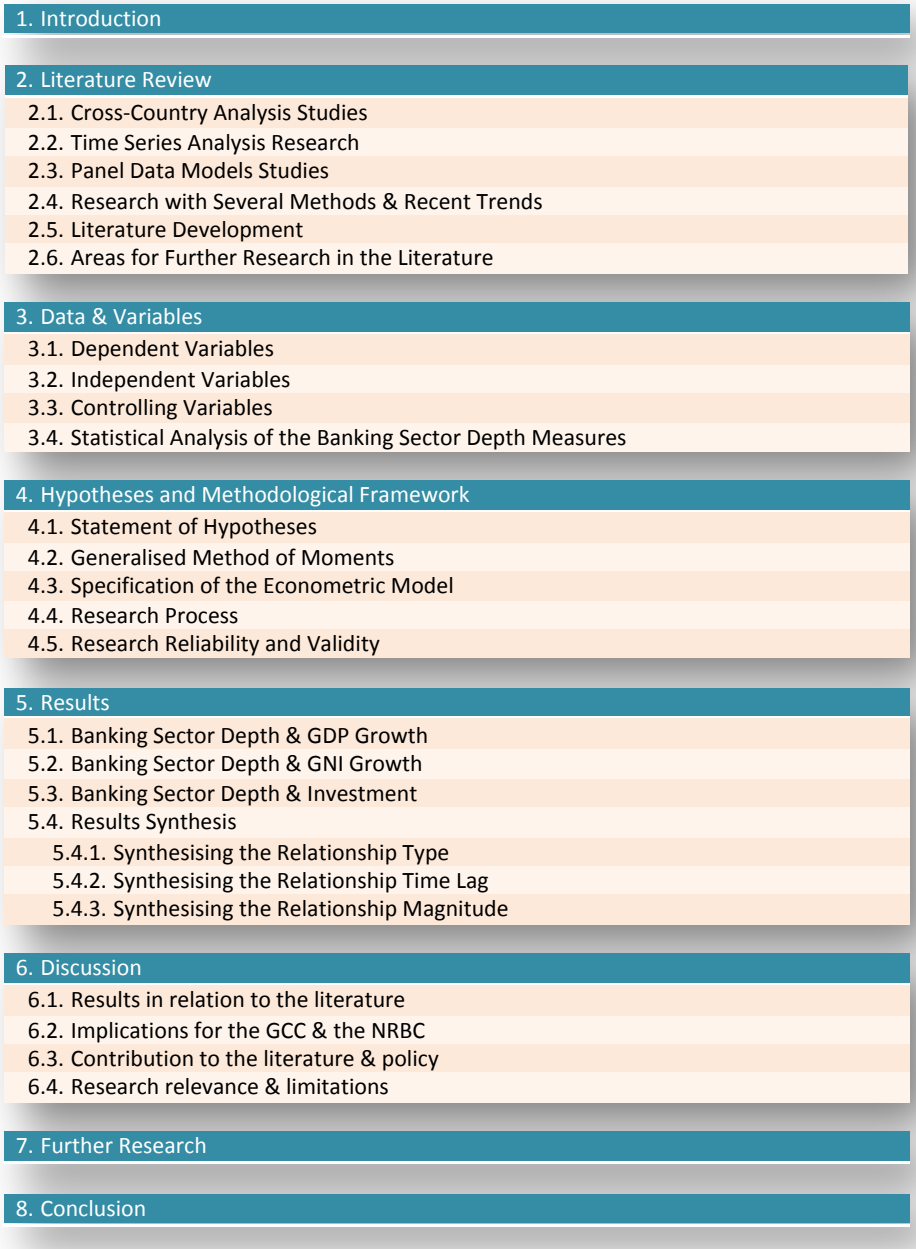

Figure 8. Research Structure of Project II

2 Literature Review

Over the years, the study of the relationship between financial development and long-term economic growth has used different research methods. The literature has particularly evolved over the last two decades with respect to the research question,

data, and models employed by scholars. Having said that, more areas have provided the potential for further research as the finance-growth nexus literature became more developed.

This section intends to review some of the main empirical methods utilised in the literature in general and in relation to the NRBC group in particular. The review also aims at highlighting the shift in the general trend in the finance-growth nexus literature with respect to the research question, data, and models employed. Finally, the review discusses areas in the literature that require further research. The section is structured as follows. First it considers the papers utilising cross-country analysis, time series analysis, panel data models, and several empirical methods. Then, the section underlines the development of the literature in relation to the research question, data, and models employed. Lastly, research gaps in the literature are discussed.

2.1 Cross-Country Analysis Studies

One of the early studies that question the relationship between financial development and economic growth is that of Goldsmith (1969). His research investigates the question using the data for 35 countries between 1860 and 1963 in a cross-country empirical model. Based on an OLS model, Goldsmith reports that an above average level of financial development (approximated by the financial intermediary assets to gross national product (GNP) ratio) accompanies periods of high level of economic growth.

King and Levine (1993a) build on Goldsmith's work and claim that Joseph Schumpeter might be right about the importance of finance for economic development. In this seminal paper, the authors conduct a cross-country analysis using data from 77 countries averaged over the 1960-1989 period and a pooled cross-country time series study[10] using data averaged over the 1960s, 70s, and 80s. The paper examines the relationship by regressing economic growth on four different measures of financial development: the liquid liabilities to GDP ratio; bank deposits, excluding the central

[10] Pooled cross-country time series studies apply regression analyses to a sample of countries at a few points in time. Such data are *aka* pooled cross-section datasets and have the features of both the cross-sectional and time series data (Wooldridge, 2009).

banks to total deposits ratio; credit issued to non-financial private sector to total credit ratio; and credit issued to non-financial private sector to GDP ratio. The regressions control for other factors that affect economic growth such as that of initial GDP per capita, the initial secondary school enrolment rate, public sector activities, inflation rate, exchange rate premium in the black market, and a measure of the economies' openness. The paper finds a strong relationship between the level of financial development and economic growth, physical capital accumulation, and economic efficiency for the period. Further, the paper finds evidence suggesting that financial development is a good predictor of long-term economic growth.

A more recent paper that employs a cross-country regression analysis is that of Beck (2011). The author examines the finance-growth relationship in the resource-based economies with the intention of identifying whether there is a resource curse in financial development. Beck investigates the relationship between financial development and economic growth in natural resource-based economies using Barro-style standard cross-country regressions. The paper runs the models employing the ratios of credit to private sector to GDP and liquid liabilities to GDP as measures of financial development as well as alternative natural resources measures. The results of the study illustrate that there is no significant difference in the relationship between financial development and economic growth in the natural resource-based economies in comparison with other countries.

The number of theoretical and conceptual limitations associated with the pure cross-country studies prompted researchers to consider other methods to investigate the finance-growth nexus. According to Ang (2008), the limitations include the focus on examining the effect of financial development on economic growth and not the reverse, the use of a single equation approach that does not control for potential endogeneity resulting in biased and inconsistent estimators, the use of instrumental variables (IVs) to overcome the endogeneity bias is inadequate when averaging data over decades, and the use of grouped countries data leads to different results compared to those of individual-countries.

2.2 Time Series Analysis Research

Some of the early papers to use time series analysis in this context are Gupta (1984) and Jung (1986).[11] Gupta investigates the relationship between financial development and economic growth for 12 countries by employing the Granger causality test and VAR procedures.[12] The paper uses the industrial output data as a proxy for economic growth due to the lack of data. The results show that causality runs from financial development to economic growth. Similarly, Jung employs the Granger causality test on 56 countries between 1950 and 1981 and finds evidence that financial development results in higher growth in developing countries. For the developed countries, results indicate a bidirectional relationship.

In comparison, Neusser and Kuegler (1998) investigate the direction of causality between financial development and growth using more advanced statistical tests. Their paper uses the annual data for 13 OECD countries (the Netherlands is excluded) from 1970 to 1991. The data used include the financial sector GDP (FGDP), manufacturing GDP (MGDP), and manufacturing total factor productivity (TFP).[13] Neusser and Kuegler employ a number of models to test for cointegration[14] and causality between FGDP and MGDP, on the one hand, and the FGDP and manufacturing TFP on the other. After testing for cointegration between FGDP and MGDP using both the Johansen and Stock-Watson approaches, the authors conclude that there is a long-term relationship between FGDP and MGDP for the majority of the countries. Testing for Granger causality, the authors only find a causal relationship between finance and manufacturing in the USA, Japan, Germany and Australia. In Canada, France and Sweden there is evidence of a relationship running from manufacturing to finance.

Xu's (2000) paper is another that exploits advanced time series techniques. The paper argues the significance of the financial development for economic growth through the

[11] Cited in Ang (2008).
[12] The Granger causality test determines whether a given series is useful in forecasting another series. A VAR model is one in which several series are modelled in terms of their own past (Wooldridge, 2009).
[13] Total factor productivity measures the rate of technical change.
[14] Two series are said to be cointegrated when they are linked and cannot drift randomly far apart. Cointegration is more formally defined as "the notion that a linear combination of two series, each of which is integrated of order one, is integrated of order zero" (Wooldridge, 2009, p.836).

domestic investment channel. Xu uses the annual data for 41 developing countries from 1960 to 1993 including real GDP, real gross domestic investment, and the financial development index. The paper employs the multivariate VAR approach. Xu finds that 27 countries out of the 41 countries show positive, long-term cumulative effects of financial development on real GDP while 14 exhibit negative, long-term cumulative elasticity. Further, Xu finds that 27 countries show the positive, cumulative effect of financial development on investment whereas 14 show negative long-term elasticities.

Despite the time series analyses advantages over the pure cross-country studies, there are a number of limitations. Ang (2008) argues that the estimation period for many time series studies are often short due to the lack of data, particularly for developing countries. Long time series are required to appropriately assess the persistent dynamics in the time series studies. In addition, the results of the Granger causality tests could be misleading. The expectations of future economic growth might stimulate financial development. If economic agents anticipate a robust future economic growth that increases the demand for financial services, more investments in the financial sector are likely to take place on the expectations of higher future profits. Finally, Ang highlights that many of the time series studies in the literature apply the approach to individual countries. The results of those studies are not sufficient to form a general view on the relationship between financial development and economic growth.

2.3 Panel Data Models Studies

The panel data analysis[15] approach is a relatively novel methodological tool in econometrics that has been used to explore the finance-growth relationship in an attempt to overcome some of the constraints associated with the cross-country studies. Levine et al. (2000) and Beck et al. (2000) are the first to utilise panel data analysis along with more advanced econometrics approaches such as IVs and the GMM estimator.[16] The

[15] Panel studies apply econometric models to panel datasets. A panel dataset "consists of a time series for each cross-sectional member in the data set" (Wooldridge, 2009, p.10).

[16] The IV approach is one that is employed when in a $Y = X\beta + u$ relationship, the independent variable (X) is endogenous and correlated with the error term (u) resulting in biased and inconsistent estimators. This is often due to omitted variables. The IV approach introduces instruments (Z) that are both correlated with the independent variable (X) and uncorrelated with the error term (u). The instruments (Z) are used

two papers use the same dataset and apply the same methodology to examine different areas in the financial development and economic growth arena.

Levine et al. (2000) contend that the exogenous component of financial intermediary development promotes economic growth. Their paper uses the average data for 74 countries for the period from 1960 to 1995. The data are averaged over five-year intervals to capture the long-term relationship. The dependent variable in the models is the real per capita GDP while the independent variables include measures of the financial intermediary development level—such as liquid liabilities to GDP ratio, measure of commercial banks' assets relative to the central bank's assets, and credit to the private sector to GDP ratio—and a conditioning information set. The GMM dynamic panel data models' results indicate a strong positive relationship between the exogenous component of financial intermediary development and the long-run economic growth. Levine et al. (2000) find that each of the financial intermediary development measures used is statistically significant at the 5% level.

Beck et al. (2000) argue that the development of a financial intermediary influences the sources of economic growth, including the total factor productivity growth, physical capital accumulation and private savings rates as well as economic growth. Their paper provides evidence for the relationship between the exogenous component of financial intermediary development and economic growth. Similarly, it shows that financial intermediary development has a considerable impact on productivity growth. The investigation into the relationship between the development of a financial intermediary and physical capital accumulation suggests a weaker relationship when using the cross-country analysis but that it is more robust under the GMM dynamic panel data approach.

Another paper that employs the GMM estimator for the dynamic panel data models is that of Barajas et al. (2013b). Their paper assesses whether the economic growth benefits from the financial sector development that differs across regions, income

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to estimate the independent variable ($\hat{X}$). Then, the dependent variable (Y) is regressed on the estimated variable ($\hat{X}$) (Berry, 2011). The IV estimator is a special case of a GMM estimator.

levels, and the type of economy, using data for 150 countries over the period from 1975 to 2000. The authors find that the effect of banking sector depth on economic growth in the MENA, Latin America and the Caribbean are lower in comparison with other regions. In the case of the MENA region, for the same level of banking depth, the paper shows that the area produces growth effects that are one-third smaller than other regions. The effects on the total economic growth are even weaker for non-oil growth in the MENA region with the impact being about half of that of the rest of the world. It is argued that the underperformance of the MENA region is explained by a "quality gap" in financial intermediation and is related to the ownership structure, competition and slow financial reforms. The results, however, suggest that the GCC States behave similarly to the high-income countries.

In considering the different economy types, Barajas et al. (2013b) show that oil exporting countries benefit less from banking sector deepening and that the benefits fall constantly with the degree of oil dependency. Their results also suggest that the GCC's countries tend to fare better in comparison with the other oil exporting countries. Finally, the paper illustrates that the benefit from financial deepening varies across income levels. The findings show that the low-income countries (LICs) as a group achieve lower economic growth benefits from the same levels of banking sector depth in other income country groups.

Despite the incorporation of the time dimension by using the panel analysis, the method is subject to econometric issues. Ang (2008) suggests that panel regressions which hold country-specific effects constant would result in a spurious relationship due to between-country differences instead of within-country differences over time.

2.4 Research with Several Methods & Recent Trends

Arcand et al. (2012) use a mixture of empirical research methodologies and datasets in order to investigate the finance-growth relationship. Their paper contends that the relationship between financial depth and economic growth is positive up to a certain threshold after which the relationship turns negative. The authors use data for different

country samples and periods between 1960 and 2010 both at the country-level and the industry-level, and employ both cross-country and panel regressions.

The cross-country OLS model builds on Beck and Levine's (2004) model by incorporating the level of credit to the private sector and a quadratic term in this variable. The latter is added to investigate the presence of a non-monotonic relationship between credit to the private sector and economic growth. In the panel studies, the authors use the system GMM estimator based on Arellano and Bover (1995) and Blundell and Bond (1998), while employing the two-step procedure of Arellano and Bond (1991), and obtain robust standard errors with Windmeijer's (2005) finite sample correction. Once again, the paper uses the same variables utilised by Beck and Levine's (2004) model and incorporates the square of the credit to the private sector. Arcand et al. (2012) also investigate the relationship at the industry-level by exploiting the model developed by Rajan and Zingales (1998). Similarly to the other models, Arcand et al. (2012) enter the square of the credit to the private sector variable into the model. Their paper runs other models to examine the number of factors' volatility, crises and regulation to explain the non-monotonic relationship. Their paper finds a strong positive relationship between financial depth and GDP growth in economies with small and intermediate financial sectors. The relationship, however, turns negative after the level of credit to the private sector relative to the GDP reaches a particular threshold (estimated to be around 80% to 100% of GDP). The results are consistent for all the models and different data levels employed.

Based on the results that the non-monotonic relationship is not explained by the volatility, crises, and strict capital requirements, Arcand et al. (2012) suggest that it is explained by the misallocation of resources view put forward by Tobin (1984). Tobin argues that an extensive financial sector results in a suboptimal allocation of resources as talents are shifted from productive sectors to the financial sector. This is as opposed to the view that the financial sector increases macroeconomic volatility and results in crises, held by Minsky (1974) and Kindleberger (2005).

Overall, the findings of Arcand et al.'s (2012) paper, following the recent global financial crisis, are significant for the future development of the literature in the area of financial development and economic growth as it paves the way for research in new areas. In fact Beck et al. (2012) capitalised on Arcand et al. and introduced the concept of the Financial Possibility Frontier that intends to define the maximum sustainable depth, outreach or breadth of the financial system using benchmarking to assess the level of financial development that can be realistically achieved for any country, given its current level of economic development.

Barajas et al. (2013a) employ the concept of the Financial Possibility Frontier as a constrained optimum financial development level to assess the relative performance of a financial system relative to others around the world. These authors intend to evaluate the performance of the financial system over time in relation to the country's characteristics and recommend policy options based on the position of each financial system. In doing so, Barajas et al. (2013a) build on the work of Beck et al. (2008) and Al-Hussainy et al. (2011) to set the financial depth benchmark by employing models where the financial depth variables are regressed on the structural characteristics and other fundamentals. Subsequently, the financial depth benchmark level for each country is estimated using the model and compared to the actual levels to identify gaps. To explain the gaps, the authors run cross-country regression models in which the average level as well as the change in the credit to the private sector gap is regressed on macroeconomic, market structure, regulatory policy, and institutional variables.

Barajas et al. (2013a) find that countries with lower inflation rates, higher remittance inflows, and more rapid previous growth tend to outperform other countries by obtaining lower gaps relative to their structural benchmarks. This is similar for economies where restrictions on foreign banks are fewer and the share of government-owned banks are lower. The authors, accordingly, recommend market-enabling and market-developing policies for countries that are below their financial depth benchmark levels, and market-harnessing policies for economies that are operating above their predicted benchmarks.

2.5 Literature Development

The key research questions in the literature have changed over the last two decades, reflecting the development of the research area. The early papers that followed King and Levine's (1993a) seminal work focus on exploring whether a relationship exists between financial development and long-term economic growth. Scholars who advocate financial development assess the relationship using different datasets and variables to illustrate that the development of the financial sector promotes economic growth. As more evidence has mounted in favour of this notion, researchers become more interested in the direction of causality. Due to the nature of the empirical models required for examining causality, more country-specific studies have emerged. Subsequently, researchers in the finance-growth nexus field shifted their attention towards examining the relationship across different geographical regions, income country groups, and economic type groups.

More recently, however, scholars in the field have started to consider whether, after a certain level of financial development, the effect on the long-term growth becomes negative. This trend reflects the change in the view that the financial development is always positive for economic growth following the Global Financial Crisis of 2008-2009, which had devastating economic consequences for the global economy in general and countries with well-developed financial sectors in particular. Today, a number of researchers are questioning the optimal level of financial development for long-term economic growth and the policies required to achieve such optimum level.

Similarly, the data and models employed in the literature have varied over time. The initial studies predominantly utilised data for developed economies in cross-country regression models. As more data became available, more time series models became prevalent in the literature. Following the introduction of the GMM estimator for the dynamic panel data models for the finance-growth nexus literature by Levine et al. (2000) and Beck et al. (2000), the approach became standard in the field. The type of models estimated also changed from linear in most of the literature to non-linear in the more recent studies. This change is associated with the shift in the key research questions in the literature, as discussed above.

The increased availability of data paved the way for researchers to consider the relationship in different country groups. In addition, the measures employed as proxies for financial development climbed from a few banking sector and stock market depth measures to a list of variables that approximate financial depth, access, stability, and efficiency. The increase in the availability of data reflects the efforts made by the World Bank to launch and maintain the Global Financial Development database (Čihák et al., 2012). Despite this effort, the database continues to be relatively limited as many of the variables included are only available for periods of less than ten years.

2.6 Areas for Further Research in the Literature

The development of the finance-growth nexus literature opened the doors to researching a number of new topics going forward. One research area is linked to assessing and explaining the differences in the relationship across countries with different levels of financial development, geographical regions, income groups, and economic types. The latter is invaluable for understanding the effect of the financial sector on long-term economic growth in different contexts.

Another area for further research is the optimal level of financial development. Research in this area thus far has considered the question from the financial depth dimension only and uses models that compare a country's level of financial development to a benchmark level based on averages for other countries. Further research will be in a position to assess the optimality question by utilising other financial development dimensions as more data become available. In addition, the future studies are required to consider different approaches for determining the optimal levels of financial development for economic growth. Benchmarking a country's level of financial development against the predicted level based on an average level for other countries adjusted for the country's structural characteristics does not provide the position of the financial development in the country to its "optimal" level. Optimality thus needs to be considered using different approaches from those provided by the literature.

Recent research in the field also points to the need for different regulations and policies to improve the positive effect of financial development on long-term economic growth. In countries with underdeveloped financial sectors, regulations and policies that encourage the development of the sector are desired, while in countries with overdeveloped financial industries, a different set of regulations and policies are required to control the sector. The literature needs to identify and assess the effectiveness of such regulations and policies using empirical research–not only theory.

A final area for further research that is worth highlighting is related to the nature of the relationship between financial development and economic growth using the four dimensions of financial development. Up to the current date, a lack of sufficient data has prevented researchers from investigating the relationship using the financial access, stability, and efficiency dimensions. Thus it is unclear for instance if firms' greater access to credit has a positive effect on long-term economic growth or if a more stable banking sector results in higher living standards over the long-term.

3 Data & Variables

This section provides an overview of the data and variables employed in this thesis. The dependent and independent variables are first discussed in terms of their sources, definitions, reasons for selection, and relation to the literature on the finance-growth nexus. Then the section underlines the controlling variables used in the models presented in this thesis. At the end of the section, descriptive statistics of the banking sector depth measures for the GCC, the NRBC, and the other countries' groups are introduced and briefly discussed.

In general, the intention behind selecting the dependent and independent variables in this research is to obtain proxies for both the banking sector depth and economic growth. Here we follow the World Bank's Global Financial Development Report (Anon, 2012) in defining the banking sector depth as the size of financial institutions relative to the overall economy, which aims at measuring the functioning of the

financial system. This is while the thesis defines economic growth as the appreciation of real income per capita over time.

3.1 Dependent Variables

The thesis includes four proxies of economic growth that are employed as dependent variables in the models estimated. The first is real GDP per capita growth. This variable is the most extensively used in the finance-growth nexus literature as a measure of economic growth. It captures the annual rate of change in the gross value added by all resident producers divided by the population in a given economy.[17] The source of the real GDP per capita growth as well as the other dependent variables discussed below is the World Development Indicators database of the World Bank. Overall, the database provides this thesis with data for the dependent and independent variables of 214 countries for the period from 1961 and 2013.

The second dependent variable is the real GNI per capita. Compared to the real GDP per capita, the real GNI per capita incorporates, in addition to the total value added by all residence producers, the net receipts of primary income from abroad (i.e. compensation of employees and property income). The aim of selecting the real GNI per capita growth is to utilise a different indicator of economic growth. The indicator can provide insights into the finance-growth relationship in countries where the real GNI per capita is the main reported measure of economic growth. Out of all the key research papers discussed in the literature review section, only Goldsmith (1969) employs GNI per capita when investigating the relationship.

The other two proxies of economic growth are the gross capital formation to GDP and the private sector gross capital formation to GDP ratios (hereafter referred to as the investment to GDP and the private investment to GDP ratios respectively). The two indicators are selected as they represent sources of economic growth. The investment to GDP is derived by dividing the total spending on additions to fixed assets plus net change in inventories by the GDP. This is while the private investment to GDP only

[17] A list of all the variables included in this thesis and their definitions is provided in Tables A.3 to A.5 in the Appendix.

includes gross outlays by the private sector in its calculation. Other papers that use one or both indicators include King and Levine (1993a), Ndikumana (2005), and Xu (2000).

3.2 Independent Variables

On the other side of the equation, the thesis includes the number of variables as measures of the banking sector depth. The first is the credit to private sector to GDP ratio, which accounts for all the financial resources provided by banks, and other depository institutions to the private sector. This indicator is by far the most used in the literature as a measure of financial development in general and banking sector depth in particular. The significance of the indicator in the finance-growth nexus literature reflects its focus on the credit facilities extended by financial intermediaries to the private sector. Other banking sector depth measures, in contrast, would include lending to the public sector which mainstream economists tend to exclude as they believe that financial sector development can only induce long-term economic growth through its relationship with the private sector. According to King and Levine, the "financial system that simply funnels credit to the government or state enterprises may not be evaluating managers, selecting investment projects, pooling risk, and providing financial services to the same degree as financial systems that allocate credit to the private sector" (1993a, p.721). The source of the data for the credit to private sector to GDP ratio as well as the money supply to GDP and the broad money supply to GDP (discussed below) is the World Development Indicators.

Other proxies of the banking sector depth are the bank assets to GDP and the bank liabilities to GDP ratios. As the name suggests, the bank assets to GDP ratio represents the size of the deposit banks' claims on the other economic sectors relative to the overall size of the economy. This is while the bank liabilities to GDP ratio is the proportion of the bank liabilities to the other economic sectors of GDP. The latter variable focuses on the funding side of the depository banking institutions, capturing their role in attracting cash deposits and equity investment from the public and the other economic sectors. Compared to the other banking sector measures, the bank assets to GDP and the bank liabilities to GDP ratios are available for relatively smaller groups of countries and for shorter periods of time. In this research, the Passport database of the

Euromonitor International provides the bank assets to GDP and bank liabilities to GDP ratios data for 170 countries for the period from 1977 to 2013.

The last two indicators of banking sector depth are the money and quasi money to GDP and the liquid liabilities to GDP ratios (hereafter the indicators are referred to as the money supply to GDP and the broad money supply to GDP ratios accordingly). The money supply to GDP ratio takes into account the currency outside the banking system plus demand and interest bearing liabilities of financial intermediaries other than those of the central government. This is compared to the broad money supply to GDP ratio, which in addition includes the liquid liabilities of non-banking financial intermediaries, such as travellers' cheques, commercial papers, and shares in mutual or market funds held by residents. The broad money supply to GDP ratio is considered to be a traditional measure and is employed by many papers in the finance-growth nexus research area due to its broader scope which captures the size of the financial system (Beck et al., 2000; King & Levine, 1993a).

3.3 Controlling Variables

All the estimated models that assess the relationship between banking sector depth and long-term economic growth in this thesis include a set of controlling variables. The controlling variables are employed to account for differences in the long-term economic growth rates associated with the initial level of the economic growth measure, the rate of inflation, government consumption, level of education, trade openness, and foreign investment. The controlling variables included here became standards in the finance-growth nexus literature (See Arcand et al., 2012; Barajas et al., 2013b, for example). The source of all the conditioning variables is the World Development Indicators database and the full definitions are provided in Table A.5 in the Appendix.

3.4 Statistical Analysis of the Banking Sector Depth Measures

Merging the World Development Indicators and the Passport databases results in a panel dataset for 214 countries for the period between 1961 and 2013. As discussed in the next section, the data from 1964 to 2013 is averaged over ten non-overlapping five-year periods. Throughout the thesis, three country groups are employed: the GCC, the NRBC, and the rest of the world countries. The GCC States group consists of Bahrain,

Kuwait, Oman, Qatar, Saudi Arabia, and the UAE. The NRBC include all the countries classified as hydrocarbon- and mineral-rich countries by the IMF (2007). The NRBC group accounts for 52 out of the 214 countries considered in this thesis and includes the six GCC countries. The third country group, as the name suggests, covers the rest of the world countries.[18]

To summarise the banking sector data for the different country groups, Tables 26 and 27 are provided.

Table 26: NRBC Group Statistical Data

Variable	No. of Observations	Mean	Standard Deviations	Minimum	Lower Quantile	Median	Higher Quantile	Maximum
Credit to Private Sector to GDP	405	20.72	16.01	0.46	9.39	16.33	27.49	102.30
Bank Assets to GDP	287	9.68	20.14	0.32	1.86	3.62	8.03	209.54
Bank Liabilities to GDP	275	5.05	8.80	0.12	1.28	2.59	5.62	111.01
Money Supply to GDP	406	32.90	20.35	2.64	18.04	26.92	44.83	116.71
Broad Money Supply to GDP	158	34.82	20.25	4.48	21.10	29.48	43.62	119.63

Table 27: Rest of the World Countries Group Statistical Data

Variable	No. of Observations	Mean	Standard Deviations	Minimum	Lower Quantile	Median	Higher Quantile	Maximum
Credit to Private Sector to GDP	1,060	42.50	38.16	1.37	16.11	30.37	56.47	290.96
Bank Assets to GDP	762	53.86	238.92	0.00	2.82	6.91	20.68	2,909.73
Bank Liabilities to GDP	751	49.37	217.05	0.00	2.07	7.14	22.17	2,500.29
Money Supply to GDP	1,008	62.24	222.67	4.89	25.24	41.61	68.46	6,936.22
Broad Money Supply to GDP	391	49.89	35.62	6.79	24.98	42.13	61.67	219.91

Tables 26 and 27 show the mean, median, standard deviation, minimum, maximum, lower quartile, and upper quartile of the banking sector measures for the NRBC group and the other countries group respectively. Comparing the data for the two country groups reveals that the mean and median levels of all the financial development measures for the NRBC group are lower than those of the corresponding measures for the other countries group. This implies that the level of financial development tends to be lower in the NRBC group. The standard deviations associated with the variables for

[18] According to the IMF (2007), hydrocarbon- and mineral-rich countries are those with at least 25% fiscal revenues and/or total exports associated with the hydrocarbon and/or mineral sectors. The economic structures of all GCC States are highly dependent on the hydrocarbon sector for generating government and export revenues. As such, all the Gulf countries share the same economic dependency on natural resources as their counterparts in the NRBC group. Tables A.1 and A.2 in the Appendix provide the full list of the countries included in each group.

the other countries are considerably higher than their counterparts in the NRBC group. The latter reflects the diversity of the other countries group where economies with low levels of banking sector depth are grouped with countries with overdeveloped financial sectors.

Table 28: GCC States Group Statistical Data

Variable	No. of Observations	Mean	Standard Deviations	Minimum	Lower Quantile	Median	Higher Quantile	Maximum
Credit to Private Sector to GDP	53	32.48	17.84	4.13	17.94	33.43	42.30	82.65
Bank Assets to GDP	42	27.10	20.22	5.99	13.51	23.72	35.29	112.33
Bank Liabilities to GDP	38	15.45	18.95	1.54	5.72	10.53	19.16	111.01
Money Supply to GDP	53	46.21	22.18	13.26	29.65	45.88	57.96	116.71
Broad Money Supply to GDP	22	41.04	28.79	13.26	17.60	28.08	57.40	119.63

Table 29: NRBC (Excluding GCC States) Group Statistical Data

Variable	No. of Observations	Mean	Standard Deviations	Minimum	Lower Quantile	Median	Higher Quantile	Maximum
Credit to Private Sector to GDP	352	18.95	14.97	0.46	8.78	14.81	24.32	102.30
Bank Assets to GDP	245	6.69	18.59	0.32	1.67	2.85	5.86	209.54
Bank Liabilities to GDP	237	3.38	3.66	0.12	1.16	2.25	4.35	31.00
Money Supply to GDP	353	30.90	19.32	2.64	17.47	25.49	39.04	116.40
Broad Money Supply to GDP	136	33.81	18.46	4.48	21.57	29.48	42.95	116.34

Tables 28 and 29 present the same statistics for the GCC countries and the NRBC excluding the GCC States. The tables show that the mean, median, and standard deviation values are consistently higher in the case of the GCC countries group than in the rest of the NRBC. Further, the mean and standard deviations for the GCC States' measures are lower than those for the countries that are not dependent on natural resources, as reported in Table 27. The statistics position the level of the banking sector depth in the GCC States between those of the NRBC and the rest of the world countries.

4 Hypotheses and Methodological Framework

This section aims at introducing the empirical method employed to answer the research question, discuss the research process, and highlight the research reliability and validity. To do so, the first subsection considers how to answer the research question by setting the research hypotheses. This is followed by an overview of the selected research

method and discussion of the rationale for selecting the method. The subsequent subsections introduce the model specifications and the research process. Finally, a discussion of how the selected research method and the research process contribute to the reliability and validity of the research is provided in the last subsection.

4.1 Statement of Hypotheses

This research questions the extent to which the banking sector depth is associated with the long-term economic growth in the GCC region in comparison with countries that are not dependent on natural resources. To answer this research question, the thesis follows the finance-growth nexus literature in employing an empirical research method. In particular, the thesis utilises the dynamic panel system GMM estimators because of their advantages as discussed below.

The thesis also employs the NRBC group as a proxy for the GCC countries. This is due to the lack of sufficient data to investigate the research question using the selected empirical method. As Tables 26 and 28 show, the number of observations of the banking sector depth measures range from 22 to 53 for the GCC group compared to 158 to 406 for the NRBC group. The NRBC group is selected as all the GCC States are members of the group and the group members share similar economic structures that are dependent on hydrocarbon and mineral resources.

To assess the extent to which banking sector depth is linked to economic growth, the thesis considers three relationship dimensions. The first is the type of relationship, the second is the time lag between the cause and effect, and the third is the relationship magnitude. Accordingly, there are three research hypotheses:

H1. The deepening of the banking sector has a positive effect on long-term economic growth in the NRBC group and the other countries group,

H2. The time lag between the deepening of the banking sector and its effect on long-term economic growth in the NRBC and the other countries group is equal, and

H3. The total effect of banking sector deepening on long-term economic growth in the NRBC group is smaller than that for the other countries group.

4.2 Generalised Method of Moments

Recent empirical work in econometrics, particularly in macroeconomics and finance, became notably dominated by the GMM estimators (Greene, 2012). According to Lars Peter Hansen, the GMM "refers to a class of estimators which are constructed from exploiting the sample moment counterparts of the population moment conditions (sometimes known as orthogonality conditions) of the data generating model" (2008, p.1). It can be shown that various estimators in econometrics—such as the OLS, two-stage least squares and IVs—are methods of moment estimators. Consider, for instance, the OLS model:

$$y_i = x_i'\beta + \varepsilon_i \tag{1}$$

The orthogonality condition assumption (i.e. the explanatory variable is uncorrelated with the error) associated with the population is given by:

$$\mathrm{E}[x_i\varepsilon_i] = \mathrm{E}[x_i(y_i - x_i\beta)] = 0 \tag{2}$$

One can write the sample analogue as:

$$\frac{1}{n}\sum_{i=1}^{n} x_i\,\widehat{\varepsilon_i} = \frac{1}{n}\sum_{i=1}^{n} x_i\left(y_i - x_i'\hat{\beta}\right) = 0 \tag{3}$$

The β estimator, which satisfies the above moment equation, is equal to that in the normal OLS model.

In the OLS example, the number of moment equations is the same as the number of unknown parameters. The latter is a case of just-identification and a unique solution for the parameter exists. There are models, however, in which the number of moment equations is greater than the unknown parameters. This is referred to as a case of over-identification and generally there is no solution for the system (Komarova, 2014). An example of over-identification is the following system of equations:

$$\frac{1}{n}\sum_{i=1}^{n} g(\xi_i, \theta) = 0 \tag{4}$$

Nevertheless, the GMM estimator can be used to provide a solution as shown below. Denote equation (4) as:

$$G_n(\theta) = \frac{1}{n}\sum_{i=1}^{n} (\xi_i, \theta) \tag{5}$$

assuming that $\{\xi_i\}_{i=1}^{n}$ is the $i.i.d.$ sequence. The GMM estimator can be defined by making $G_n(\theta)$ close to zero by minimising the objective function $G_n(\theta)' W_n G_n(\theta)$:

$$\hat{\theta} = \arg\min_{\theta \in \Theta} G_n(\theta)\, W_n G_n(\theta) \tag{6}$$

where $\hat{\theta}$ is the GMM estimator and W_n is the probability distribution weight matrix that is assumed to converge in probability to a probability distribution W_0 (Komarova, 2014). In practice, the optimal weighting matrix that results in the smallest covariance matrix for the GMM estimator is the inverse of the covariance matrix of the sample moment (Verbeek, 2012).

Arellano and Bond (1991) introduce the difference GMM estimator for the dynamic panel data models. A dynamic panel data model is one that is characterised by the presence of lagged dependent variables on the right-hand side of the equation. For instance:

$$y_{it} = \delta y_{i,t-1} + x_{it}'\beta + u_{it} \quad i = 1, \dots, N; \;\; t = 1, \dots, T \tag{7}$$

$$u_{it} = \mu_i + v_{it} \tag{8}$$

where δ is a scalar, x_{it}' is $1\times K$, β is $K\times 1$, μ_i is the individual effect and v_{it} is the disturbance.[19] Arellano and Bond (1991) suggest the difference GMM model to deal with the issues associated with it, including the lagged dependent variables as explanatory variables. The presence of the lagged dependent variables on the right-hand side of the regression equation result in a biased and inconsistent[20] OLS estimator due to the correlation between the lagged dependent variables and the individual effect. Although the within transformation of the fixed effect panel data model eliminates the individual effect, the inclusion of the lagged dependent variables among the regressors makes the fixed effect estimator biased and its consistency depends upon T (time periods) being large. In addition, the random effects Generalised Least Squares (GLS) estimator is biased in a dynamic panel data model. Anderson and Hsiao (1981) suggest first differencing to deal with the individual effect and they employ lagged dependent variables as instrument variables for the differenced dependent variables. The estimation method, according to Ahn and Schmidt (1995), results in consistent IV estimations but not necessarily efficient estimates of the model's parameters as the method fails to exploit all the available moment conditions.

Arellano and Bond (1991) derive the difference GMM by introducing additional instruments. They do so by exploiting the orthogonality conditions that exist between the lagged dependent variables y_{it} and the disturbances v_{it}. To illustrate this, consider the simple autoregressive model with no regressors:

$$y_{it} = \delta y_{i,t-1} + u_{it} \quad i = 1, \dots, N; \; t = 1, \dots, T \tag{9}$$

$$u_{it} = \mu_i + v_{it} \tag{10}$$

where $\mu_i \sim i.i.d.(0, \sigma_\mu^2)$ and $v_{it} \sim i.i.d.(0, \sigma_v^2)$ are independent of each other and among themselves. To eliminate the individual effect μ_i, the model is first differenced to yield:

[19] The difference and system GMM estimators discussion (including references to other papers) is based on Baltagi (2005) and Bond (2013).

[20] Wooldridge defines a biased estimator as an "estimator whose expectation, or sampling mean, is different from the population value it is supposed to be estimating" (2009, p.835). This is while an inconsistent estimator refers to an estimator that "does not converge (in probability) to the correct population parameter as the sample size grows" (2009, p.840).

$$y_{it} - y_{i,t-1} = \delta\left(y_{i,t-1} - y_{i,t-2}\right) + (v_{it} - v_{i,t-1}) \tag{11}$$

For the first period ($t = 3$), the relationship is as follows:

$$y_{i3} - y_{i2} = \delta(y_{i2} - y_{i1}) + (v_{i3} - v_{i2}) \tag{12}$$

Since y_{i1} is correlated with $(y_{i2} - y_{i1})$ but not with $(v_{i3} - v_{i2})$, it is considered to be a valid instrument. In the second period ($t = 4$), the relationship is given by:

$$y_{i4} - y_{i3} = \delta(y_{i3} - y_{i2}) + (v_{i4} - v_{i3}) \tag{13}$$

It follows that y_{i2} as well as y_{i1} are correlated with $(y_{i3} - y_{i2})$ but uncorrelated with $(v_{i4} - v_{i3})$ making both valid instruments. An additional valid instrument is added accordingly to each period until period $t = T$ is reached. To account for the differenced error term in the model, the differenced equation is pre-multiplied by a matrix of instrument W to yield[21]:

$$W'\Delta \mathrm{y} = \mathrm{W}'(\Delta \mathrm{y}_{-1})\delta + W'\Delta v \tag{14}$$

By running GLS on the latter, the Arellano and Bond (1991) preliminary one-step consistent estimator is obtained by:

$$\begin{aligned}\hat{\delta}_1 = {} & [(\Delta \mathrm{y}_{-1})'W(W'(I_N \otimes G)W)^{-1}W'(\Delta \mathrm{y}_{-1})]^{-1} \\ & \times [(\Delta \mathrm{y}_{-1})'W(W'(I_N \otimes G)W)^{-1}W'(\Delta \mathrm{y})]\end{aligned} \tag{15}$$

Following Hansen (1982), the optimal GMM estimator can be obtained using equation (15) but after replacing:

[21] Refer to Baltagi (2005) for a full account of the mathematical derivation.

$$W'(I_N \otimes G)W = \sum_{i=1}^{N} W_i' G W_i \tag{16}$$

with

$$V_N = \sum_{i=1}^{N} W_i'(\Delta v_i)(\Delta v_i)' W_i \tag{17}$$

This is while the two-step Arellano and Bond GMM estimator is derived by replacing the Δv with the differenced residuals obtained from the first step in the following formula:

$$\hat{\delta}_2 = \left[(\Delta y_{-1})' W \widehat{V_N}^{-1} W' (\Delta y_{-1})\right]^{-1} \times \left[(\Delta y_{-1})' W \widehat{V_N}^{-1} W' (\Delta y)\right] \tag{18}$$

Including other regressors in the difference GMM model requires specifying whether they are strictly exogenous, predetermined, or endogenous variables. The regressor x_{it} in the dynamic panel data equation (7) is considered exogenous if $E(x_{it}\, v_{is}) = 0$ for all $t, s = 1, \ldots, T$ but all x_{it} are correlated with the individual effect μ_i. All the x_{it} are thus valid instruments for the first differenced of equation (7) and equation (14) is given by:

$$W'\Delta y = W'(\Delta y_{-1})\delta + W'(\Delta x)\beta + W'\Delta v \tag{19}$$

and the one- and two-step estimators of (δ, β') can be obtained by:

$$\begin{pmatrix} \hat{\delta} \\ \hat{\beta} \end{pmatrix} = \left[(\Delta y_{-1}, \Delta X)' W \widehat{V_N}^{-1} W' (\Delta y_{-1}, \Delta X)\right]^{-1} \times \left[(\Delta y_{-1}, \Delta X)' W \widehat{V_N}^{-1} W' (\Delta y)\right] \tag{20}$$

The regressor x_{it} is considered to be predetermined if $E(x_{it}\, v_{is}) \neq 0$ for all $s < t$ and zero otherwise. Here only x_{it} variables lagged for one or more periods (i.e. $[x_{i1}', x_{i2}', \ldots, x_{i(s-1)}']$) are valid instruments. The estimators of (δ, β') are obtained using equation (20) when the regressors are predetermined. The explanatory variable x_{it} is

said to be endogenous if $E(x_{it}\, v_{is}) \neq 0$ for all $s \leq t$ but $E(x_{it}\, v_{is}) = 0$ for all $s > t$. The only difference between the predetermined and the endogenous variable is that the latter allows for correlation between x_{it} and v_{it} at time t. The endogenous variables lagged for two or more periods (i.e. $[x'_{i1},\ x'_{i2}, \ldots, x'_{i(s-2)}]$) are valid instruments (StataCorp, 2013a) and (δ, β') are derived using equation (20) once again.

As the consistency of the GMM estimator depends on the fact that $E\left[\Delta v_{it}\, \Delta v_{i,t-2}\right] = 0$, Arellano and Bond (1991) suggest a testing hypothesis that there is no second-order serial correlation for the disturbances of the first-differenced equation. In addition, Arellano and Bond propose performing Sargan's test of over-identifying restrictions. If the model is over-identified, the latter test is conducted to investigate whether the over-identifying restrictions are close to zero to be consistent with their validity when evaluated at the optimal GMM parameter estimators (Bond, 2013). Another test for over-identifying restrictions is the *J* statistics of Hansen. The two tests for over-identifying restrictions are linked where the Sargan's statistic is considered a special case of the Hansen's *J* statistic under the assumption of conditional heteroskedasticity (Baum et al., 2003). Roodman suggests that if "non-sphericity is suspected in the errors, as in robust one-step GMM, the Sargan test statistic … is inconsistent. In that case, a theoretically superior over-identification test for the *one-step* estimator is that based on the Hansen statistic from a *two-step* estimate" (italics in original, 2006, p.12).

An additional mild stationary restriction on the initial condition process enabled Blundell and Bond (1998) to extend the difference GMM estimator by using lagged differences of y_{it} as instruments for equations in levels in addition to the lagged levels of y_{it} as instruments for equations in first differences. The extended model is referred to as the system GMM estimator. Blundell and Bond's paper shows that the system GMM estimator has considerable efficiency gains over the basic first-difference GMM estimator as the value of δ gets closer to 1 and $\left(\frac{\sigma_\mu^2}{\sigma_u^2}\right)$ increases.[22] Thus the system GMM

[22] The first-difference GMM refers to the estimation results after first-differencing the data in order to remove the fixed effects. The system GMM expands the difference GMM by estimating simultaneously in differences and levels, distinctly instrumenting the two equations (Roodman, 2009).

estimator is particularly relevant for panel data models with short T and persistent series. Based on Monte Carlo experiments, Blundell et al. (2001) show that the system GMM estimator not only improves the precision but also the finite sample bias (Baltagi, 2005).

Bond (2013) argues that the GMM estimation method is not limited to the dynamic panel data models as it can be useful for panel data models that do not include lagged dependent variables as regressors. Bond (2013) illustrates that in models such as:

$$y_{it} = \beta x_{it} + \mu_i + \nu_{it} \quad (21)$$

where x_{it} is correlated with the individual effect μ_i and not strictly exogenous with respect to v_{it}, the application of the GMM methods provides a consistent estimator of β as $N \to \infty$ with T fixed.

Alternative estimation methods to the system GMM for dynamic panel data models include the fixed and random effects models. The fixed and random effects models allow the researcher to estimate the relationship between the dependent and independent variables using panel data while modelling differences in the behaviour across individuals. Using the fixed and random effects to estimate dynamic panel data models, however, results in the lagged dependent variable becoming correlated with the disturbance, even if the disturbance is not itself autocorrelated (Greene, 2012). As discussed above, scholars overcome this complication through the use of instrumental variables and more recently the GMM estimator.

Another alternative to the GMM panel data models is the panel data cointegration models. The latter technique enables the researcher to model the short-term as well as the long-term relationships between the variables of interest. An advantage of the GMM estimator over the panel data cointegration models is its ability to control for the unobserved country-specific effects.

According to Levine et al., the dynamic panel GMM estimators are designed to overcome some of the econometric problems faced by other empirical methods in the finance-growth nexus, including those associated with the "unobserved country-specific effects and joint endogeneity of the explanatory variables in lagged-dependent variables models, such as growth regressions" (2000, p.33).[23] Roodman, however, argues that the GMM estimators for the dynamic panel data models are complicated and can result in invalid estimates. He states that implementing the models using statistical software "stuffs them into a black box, creating the risk that the user not understanding the estimators' purpose, design, and limitations will unwillingly misuse the estimators" (2009a, p.87). As discussed below, Roodman proposes a number of measures to mitigate this risk.

4.3 Specification of the Econometric Model

The estimated models in this research follow two general regression equations. The first is given by:

$$y_{i,t} = \alpha_t + \beta y_{i,t-1} + \gamma_j x_{i,t-j} + \delta_j z_{i,t-1} + \zeta_j w_{i,t} + \nu_{it} \qquad (22)$$

where the economic growth measures ($y_{i,t}$) are regressed on a constant (α_t), its own first time lag ($y_{i,t-1}$), current and time lagged measures of banking sector depth ($x_{i,t-j}$), lagged values of a controlling variables set ($z_{i,t-1}$), and time dummy variables ($w_{i,t}$). The regression equation is designed to assess the effect of changes in the current and lagged values of the banking sector measure on economic growth while controlling for differences among countries and variation over time.

There are two sets of controlling variables. The first is the simple conditioning set which includes the initial value of real GDP per capita (or real GNP per capita in models where the dependent variable is real GNP per capita) and education. This is while the second is the full conditioning set which consists of the variables in the simple conditioning set plus measures of inflation, government spending, trade openness, and

[23] The GMM method is selected to estimate the dynamic panel date models here over, for instance, the 2SLS method due to the ability of the former to deal with the individual effect in the dynamic models while its *"estimator is consistent and asymptotically more efficient than the first-differenced 2SLS estimator"* (Huang, 2010, p.1669).

foreign investment. The time lags of the controlling variables are used instead of the current variables to avoid any endogeneity problems.

The second regression equation employed here is as follows:

$$y_{i,t} = \alpha_t + \beta y_{i,t-1} + \gamma_j x_{i,t-j} + \eta_j x_{i,t-j}^2 + \delta_j z_{i,t-1} + \zeta_j w_{i,t} + \nu_{it} \qquad (23)$$

Regression equation (23) includes all the variables in regression equation (22) along with the squared values of the current and time lagged banking sector depth measures ($x_{i,t-j}^2$) to allow for non-linear relationships. The second equation follows the recent findings by Arcand et al. (2012) which suggests that the relationship between financial development and economic growth is non-monotonic.

4.4 Research Process

The thesis estimates regression equations 22 and 23 using system GMM for dynamic panel data models for the NRBC and the other countries groups.[24] The total number of countries included in the models is 194 after excluding those with banking sectors' depth ratios to GDP of 1.50 or more. The excluded countries are from both country groups and consist of economies with overdeveloped financial sectors and/or are considered offshore banking centres.[25] The research discounts such countries to ensure that their exceptionally high levels of financial development do not dilute the results. For each country group, the models are estimated using the various combinations of banking sector depth and economic growth measures as well as the different sets of control variables. Accordingly, for each regression equation, 120 general models are estimated.

The research employs the general to specific approach to eliminate statistically invalid models and arrive at the appropriate combination of explanatory variables' time lags. The general to specific approach, which is often referred to as the LSE approach

[24] All the models are estimated using the "xtabond2" command developed by David Roodman in Stata version 13.1 (StataCorp, 2013b).

[25] The countries excluded from the other countries group are the Bahamas, Cyprus, Denmark, Hong Kong, Iceland, Ireland, Japan, Luxembourg, Macoa, Malta, Mauritius, Netherlands, Panama, Portugal, Spain, Switzerland, United Kingdom, Vanuatu, and Zimbabwe. From the NRBC group, only the Syrian Arab Republic is excluded.

following the work of David F. Hendry at the London School of Economics, is frequently used in the field of economics for identifying the most statistically significant models. Campos et al. explain that in this approach, the "empirical analysis starts with a general statistical model that captures the essential characteristics of the underlying dataset, i.e., that general model is congruent. Then, that general model is reduced in complexity by eliminating statistically insignificant variables, checking the validity of the reductions at every stage to ensure congruence of the finally selected model" (2005a, p.3).

The decision to select this approach reflects the considerable number of models that need to be estimated and tested. The approach starts by estimating the general model where all the explanatory variables are included. Then the significance of the banking sector depth explanatory variables is assessed using the t- and z-statistic probability values. In each stage, the most insignificant banking sector explanatory variable is eliminated and the model is re-estimated. Note that, in the general models, the current and first three time lags of the banking measures are included. The controlling and time dummy variables are kept intact throughout the general to specific elimination process, regardless of their statistical significance, to ensure that all the models are controlled for differences among countries and variation over time. Finally, the model with one or more banking sector independent variables that are significant at the 10% level minimum are shortlisted.

Subsequently, the shortlisted models are tested for second-order serial correlation and joint validity of the instruments. The second-order serial correlation is a test of the validity of the lags included in the model. This is while the Hansen over-identification test is employed to establish the joint validity of the instruments in the GMM models (Roodman, 2009a). The models that satisfy both tests are finally selected.

4.5 Research Reliability and Validity

The research process implemented in this thesis, including the application of the general to specific approach and the different statistical tests employed, is intended to ensure the objectivity and replicability of the research. Conducting this research without a clear

procedure in terms of selecting the statistically valid models could impair the objectivity of this research as the researcher would select the models based on a subjective assessment of the various statistical tests. Further, the use of a systematic research approach enables other researchers to replicate the process and arrive at the same results. The approach can also be applied using other explanatory variables and in the context of different country groups.

The models estimated here use a number of specifications that assert the research rigour and provide confidence in their results. First, in all estimated models, the independent and control variables are treated as endogenous variables and only the time dummy variables are treated as strictly exogenous. Under the former, the lagged differences of the endogenous variable are valid instruments as they should not be correlated with contemporary and past errors. This is where under the strictly exogenous assumption, the contemporaneous and past differences can be employed as instruments (Roodman, 2009a). The system GMM approach deals with the potential issue of non-stationarity in the explanatory variables by employing the first differences as instruments.

Another consideration that is taken into account when specifying the models is the number of instruments used. Roodman states that a "large instrument collection overfits endogenous variables even as it weakens the Hansen test of instruments' joint validity" (2009b, p.1). The estimated models deal with this issue in two ways. The first is to limit the number of instruments employed to the number of countries in the panel. This is considered the "minimally arbitrary rule of thumb" (Roodman, 2006, p.13). Secondly, the instruments are "collapsed" by combining instruments through addition into smaller sets (see Roodman, 2009b).

Further, the models adopt the two-step estimation with the corrected errors pioneered by Windmeijer (2005). The two-step standard errors with Windmeijer correction are quite accurate, according to Roodman, and their "estimation with corrected errors seems modestly superior to the cluster-robust one-step estimation" (2009a, p.97). Note that the corrected errors are robust to heteroskedasticity and arbitrary patterns of autocorrelation within individuals. Another correction that is applied to the NRBC group models is the

small-sample corrections to the covariance matrix estimate. The models, accordingly, are tested using the t-test instead of the z-test statistics for the coefficients and the F-test in place of the Wald χ^2 test for the overall fit.

Finally, the research design should allow for generalising the results for the NRBC and the GCC States. All the members of the NRBC group share a common economic structure, which is dependent on hydrocarbon and mineral resources for government revenues, exports, and/or economic growth. The results of the dynamic panel GMM estimators for this group would reflect the nature of the relationship between banking sector depth and economic growth under such an economic structure. Hence the findings are not limited to the country group as a whole but are also applicable to any economy that is dependent on natural resources, as defined in this thesis.

Researchers applying the non-monotonic models to individual NRBC members, however, ought to consider the level of the banking sector development first. This is particularly relevant to economies with relatively low levels of banking sector development, as in the LICs, as well as with relatively high levels of banking sector depth, as in the GCC States. The non-linear relationship for those two extremes could lead to different conclusions about the effect of banking sector deepening on long-term economic growth than for the NRBC members with levels of development closer to the country group mean.

5 Results

This section presents the results of the GMM estimators employed to investigate the relationship between the banking sector depth and the long-term economic growth. The section is divided into four subsections. The first subsection reports the estimation results of the models regressing GDP per capita measures on the banking sector development indicators for the NRBC group and the rest of the world country group. The second subsection presents the results associated with the finance-growth models where the GNI per capita growth is used as the dependent variable for the same country groups. In the third subsection the findings of the estimators that resulted from

investment specifications and measures on the banking sector depth for the two country groups are elaborated. Finally, the results for each country group are synthesised and compared along three relationship dimensions: type, time lag between cause and effect, and magnitude.

5.1 Banking Sector Depth & GDP Growth

Table 30 reports the models in which the long-term real GDP per capita in natural logarithms (in logs) and growth rates are regressed on the credit to private sector to GDP measures.[26] Model 2 shows that in the NRBC the credit to private sector to GDP is positively associated with long-term growth under simple conditioning (i.e. controlling for the initial level of real GDP per capita and education) when the total effect is considered. Model number 256 confirms those results. This suggests that the relationship between the credit to private sector to GDP and economic growth in the NRBC is non-monotonic. For the other countries, although the level models and the non-monotonic models indicate similar relationships to those of the NRBC, the AR(2) probability values point to models' misspecification (see models 6 to 10 in Table A.6 and models 259 to 264 in Table A.21 in the Appendix). Employing the real GDP per capita growth rate instead of the real GDP per capita in logs in the models yields no statistically significant results.

[26] The research employs the real GDP per capita as well as the real GDP per capita growth rate. The former measure of economic growth is utilised to capture the effect of the banking sector measures on the actual levels of per capita income, while the latter measure is adopted to capture the influence of the sector development on the growth rate of the economic growth indicator. The thesis applies the same when employing the GNI as a measure of economic growth below.

Table 30: Credit to Private Sector & Real GDP per Capita

Model Number	2	256
Country Group	NRBC	
Dependent Variable	Real GDP per Capita	
Independent Variables		
1st Lag of Initial Real GDP per Capita	0.9475***	0.9896***
	(0.111)	(0.068)
1st Lag of Credit to Private Sector to GDP Ratio	0.2171**	0.0153**
	(0.091)	(0.007)
2nd Lag of Credit to Private Sector to GDP Ratio	-0.1878*	
	(0.101)	
1st Lag of Credit to Private Sector to GDP Ratio Squared		-0.0002**
		(0)
1st Lag of Gross Secondary School Enrolment Rate	0.2947	0.1059
	(0.237)	(0.164)
Constant	-0.6171	-0.3888
	(0.6)	(0.589)
Observations	193	221
Groups	45	46
Instruments	31	39
AR(2)	-0.78	-1.33
AR(2) p-value	0.433	0.183
Hansen Overidentification Test	18.81	25.77
Hansen p-value	0.598	0.586

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between credit to private sector to GDP ratio and real GDP per capita. The models employ data for the period between 1964 and 2013 which is averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.6 and A.21 in the Appendix.

Using simple conditioning, model numbers 20 and 28 in Table 31 illustrate that the relationship between the third lag of bank assets to GDP ratio and the real GDP per capita is positive for the NRBC group. In contrast, model number 30 shows that the relationship between the banking sector depth and the long-term economic growth is negative for the NRBC group when full conditioning is applied (i.e. controlling for the initial level of real GDP per capita, education, inflation, government spending, trade openness, and foreign investment). For the other countries group, the relationship between the contemporaneous value of bank assets to GDP and the GDP per capita is positive under simple conditioning. The relationship for the other countries continues to have the same sign with full conditioning but at a smaller magnitude and with a three time period lag effect. When GDP per capita is regressed on the bank assets to GDP ratio and its squared value, we find no evidence of a non-monotonic relationship.

Table 31: Bank Assets to GDP & Real GDP per Capita

Model Number	20	28	30	32	35
Country Group	NRBC	NRBC		Other	
Dependent Variable	Real GDP per Capita	Real GDP per Capita Growth Rate		Real GDP per Capita Growth Rate	
Independent Variables					
1st Lag of Initial Real GDP per Capita	0.8796***	-1.7097	-2.0931	-0.1752	-1.7778**
	(0.108)	(2.23)	(2.216)	(0.997)	(0.794)
Bank Assets to GDP Ratio				1.5269***	
				(0.491)	
1st Lag of Bank Assets to GDP Ratio			-1.6698*		
			(0.965)		
3rd Lag of Bank Assets to GDP Ratio	0.2953**	4.9679*			0.728**
	(0.117)	(2.86)			(0.366)
1st Lag of Gross Secondary School Enrolment Rate	0.1456	-1.3631	-0.3378	0.6169	2.9961**
	(0.172)	(3.413)	(2.074)	(1.716)	(1.299)
1st Lag of Inflation Rate			-0.76		2.0243
			(1.371)		(2.824)
1st Lag of Government Consumption to GDP Ratio			4.8785		0.3016
			(3.868)		(0.903)
1st Lag of FDI to GDP Ratio			0.4645		0.4022
			(0.567)		(0.441)
1st Lag of Trade to GDP Ratio			3.8558		-0.4904
			(3.063)		(1.358)
Constant	0.4078	17.3786	-12.5448	-2.6128	3.5884
	(0.917)	(16.53)	(26.774)	(3.845)	(5.62)
Observations	116	116	144	420	246
Groups	41	41	40	93	82
Instruments	23	23	34	29	54
AR(2)	-0.85	-0.09	0.16	-1.43	-0.85
AR(2) p-value	0.395	0.926	0.873	0.151	0.394
Hansen Overidentification Test	6.14	14.99	19.4	19.45	49.17
Hansen p-value	0.987	0.525	0.56	0.428	0.24

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between bank assets to GDP ratio and real GDP per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.7 and A.22 in the Appendix.

As shown in Table 32, the first lag of the bank liabilities to GDP ratio is positively associated with the long-term economic growth in the NRBC group when full conditioning is adopted. The non-monotonic models find the link between the different lags of the banking sector depth measure and the real GDP per capita level to be negative when considering the total effect. Model number 47, which incorporates all the controlling variables, finds that an increase in the level of banking liabilities to GDP ratio leads to an increase in the contemporaneous rate of growth in real GDP per capita in the NRBC group. The models that utilise the rate of growth rather than the logs of real GDP per capita for the NRBC group find no evidence of a non-monotonic relationship (see models 289 to 301 in Table A.23 in the Appendix). In the case of the other countries group, the only model that passes the second-order serial correlation and the Hansen tests is model number 303. The latter model applies simple conditioning when estimating the relationship between the real GDP per capita growth rate on the

one hand and the bank liabilities to GDP ratio and its squared values on the other. The results suggest a negative non-monotonic relationship.

Table 32: Bank Liabilities to GDP & Real GDP per Capita

Model Number	39	292	47	303
Country Group	NRBC	NRBC	NRBC	Other Countries
Dependent Variable	Real GDP per Capita	Real GDP per Capita	Real GDP per Capita Growth	Real GDP per Capita Growth
Independent Variables				
1st Lag of Initial Real GDP per Capita	0.9502***	0.9189***	-2.062	-0.0182
	(0.076)	(0.076)	(1.565)	(2)
Bank Liabilities to GDP Ratio		0.0374***	1.6795**	
		(0.011)	(0.702)	
1st Lag of Bank Liabilities to GDP Ratio	0.1042*	-0.0614**		
	(0.056)	(0.024)		
3rd Lag of Bank Liabilities to GDP Ratio				-0.1514**
				(0.063)
Bank Liabilities to GDP Ratio Squared		-0.0005***		
		(0)		
1st Lag of Bank Liabilities to GDP Ratio Squared		0.0017***		
		(0.001)		
3rd Lag of Bank Liabilities to GDP Ratio Squared				0.0009*
				(0.001)
1st Lag of Gross Secondary School Enrolment Rate	-0.0251	0.1012	-0.3521	1.8282
	(0.119)	(0.109)	(2.773)	(4.218)
1st Lag of Inflation Rate	-0.1368	-0.1855**	-0.9661	
	(0.085)	(0.076)	(0.891)	
1st Lag of Government Consumption to GDP Ratio	0.1114	-0.0271	0.7326	
	(0.159)	(0.116)	(3.31)	
1st Lag of FDI to GDP Ratio	0.0224	0.0234	0.5652	
	(0.039)	(0.023)	(1.101)	
1st Lag of Trade to GDP Ratio	0.3936	0.0887	3.8314	
	(0.261)	(0.163)	(3.823)	
Constant	-1.6156	0.1614	-2.499	-4.5233
	(1.226)	(0.866)	(18.572)	(4.078)
Observations	139	139	141	261
Groups	39	39	39	84
Instruments	34	34	34	26
AR(2)	-1.36	-0.92	0.31	-0.98
AR(2) p-value	0.175	0.357	0.756	0.329
Hansen Overidentification Test	19.91	13.83	17.18	22.58
Hansen p-value	0.527	0.74	0.7	0.207

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between bank liabilities to GDP ratio and real GDP per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.8 and A.23 in the Appendix.

Turning to the link between the money supply to GDP ratio and the long-term economic growth, the first model in Table 33 indicates that the link is negative and non-linear. This is while model number 57 shows that the total effect of the money supply to GDP ratio is positive for the real GDP per capita level. Model numbers 66 and 68 suggest that under simple and full conditioning the relationship between the second lag of money supply and the real GDP per capita growth rate in the other countries group is positive. A 10% fall in the money supply to GDP ratio in those countries would lead to a drop in

the real GDP per capita growth rate by about 30%. Accordingly, if the average per capita growth rate in the other countries group is 5% for instance, a 10% fall in the money supply to GDP ratio would reduce that growth rate by 30% to 3.5%. The positive association in the case of the other countries group is, to a certain extent, also confirmed by model 323. Model 323 shows that the real GDP per capita growth rate moves in tandem with the banking sector depth proxy up to a certain level after which the relationship turns negative.

Table 33: Money Supply to GDP & Real GDP per Capita

Model Number	307	57	66	68	323
Country Group	NRBC	Other	Other		Other
Dependent Variable	Real GDP per Capita	Real GDP per Capita	Real GDP per Capita Growth Rate		Real GDP per Capita Growth Rate
Independent Variables					
1st Lag of Initial Real GDP per Capita	0.9657***	0.9298***	-1.5008	-2.2095*	-0.9518
	(0.085)	(0.043)	(1.159)	(1.302)	(0.818)
Money Supply to GDP Ratio		0.3878***			
		(0.115)			
1st Lag of Money Supply to GDP Ratio		-0.3015**			
		(0.12)			
2nd Lag of Money Supply to GDP Ratio	-0.017**	0.0985**	3.1648***	3.0299**	0.098**
	(0.008)	(0.043)	(1.155)	(1.371)	(0.045)
2nd Lag of Money Supply to GDP Ratio Squared	0.0001*				-0.0007**
	(0)				(0)
1st Lag of Gross Secondary School Enrolment Rate	0.1969**	0.0646	2.5003	3.6341*	2.3793**
	(0.094)	(0.076)	(2.17)	(1.892)	(1.197)
1st Lag of Inflation Rate				-0.4888	1.4353
				(2.002)	(1.635)
1st Lag of Government Consumption to GDP Ratio				1.5335	-0.0304
				(1.899)	(1.901)
1st Lag of FDI to GDP Ratio				-0.3873	-0.3267
				(0.683)	(0.565)
1st Lag of Trade to GDP Ratio				2.9389*	1.7096
				(1.637)	(1.462)
Constant	-0.0155	-0.3049	-5.302	-23.3666**	-7.9677
	(0.657)	(0.206)	(10.362)	(9.595)	(6.025)
Observations	196	432	436	375	375
Groups	45	101	101	95	95
Instruments	36	35	31	60	67
AR(2)	-1.36	-1.6	1.06	0.69	0.23
AR(2) p-value	0.173	0.11	0.291	0.489	0.821
Hansen Overidentification Test	20.58	17.38	22.01	50.61	63.63
Hansen p-value	0.763	0.742	0.34	0.333	0.15

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between money supply to GDP ratio and real GDP per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.9 and A.24 in the Appendix.

In Table 34, where the models investigate the significance of the long-term relationship between the banking sector depth measures and the real GDP per capita, the findings lend support to the notion that the banking sector development promotes economic growth. Model number 76 reveals that a 1% rise in the broad money supply to GDP ratio in the group of other countries results in a 0.285% increase in the real GDP per capita. A positive association between the broad money supply to GDP and the real

GDP per capita growth rate is found in model number 80 for the NRBC group and model number 84 for the other countries group. The models in Table 34 also indicate that a non-monotonic relationship between the broad money supply to GDP ratio and economic growth exists in countries that are not dependent on natural resources. The results of model numbers 330 and 332 provide evidence of a relationship that is non-linear and positive (up to a certain point) between the second lag of the banking sector depth indicator and the real GDP per capita level, with a statistically significant explanatory variable at the 1% test level. Replacing the logs of the real GDP per capita with the real GDP per capita growth rate also yields similar results in model numbers 338 and 340. In model 338, the first lag of the broad money supply to GDP ratio is found to be positively related to long-term economic growth when simple conditioning is applied. This is while, under full conditioning, model number 340 shows the second lag of the broad money supply to GDP ratio to be statistically significant at the 5% test level.

Table 34: Broad Money Supply to GDP & Real GDP per Capita

Model Number	76	330	332	80	84	338	340
Country Group	Other	Other		NRBC	Other		Other
Dependent Variable	Real GDP per Capita	Real GDP per Capita		Real GDP per Capita Growth Rate	Real GDP per Capita Growth Rate		Real GDP per Capita Growth Rate
Independent Variables							
1st Lag of Initial Real GDP per Capita	1.0151***	0.9696***	0.9312***	5.7412	-0.0664	1.3857	-1.1771
	(0.069)	(0.075)	(0.08)	(8)	(1.125)	(1.133)	(1.2)
1st Lag of Broad Money Supply to GDP Ratio						0.2731***	
						(0.101)	
2nd Lag of Broad Money Supply to GDP Ratio	0.2849**	0.0179***	0.0217***	8.7853***	6.9298***		0.3548**
	(0.134)	(0.007)	(0.007)	(2.657)	(2.441)		(0.139)
1st Lag of Broad Money Supply to GDP Ratio Squared						-0.002***	
						(0.001)	
2nd Lag of Broad Money Supply to GDP Ratio Squared		-	-				-0.0021**
		0.0001***	0.0001***				(0.001)
1st Lag of Gross Secondary School Enrolment Rate	-0.0759	0.0455	0.0365	-11.035	-1.8248	-2.7123	0.0191
	(0.129)	(0.137)	(0.199)	(8.126)	(1.635)	(2.282)	(1.586)
1st Lag of Inflation Rate	-0.0448		-0.1455	1.3364	3.0724		1.4061
	(0.253)		(0.238)	(5.06)	(3.495)		(3.378)
1st Lag of Government Consumption to GDP Ratio	-0.0364		0.0214	-5.8791	-1.3977		-0.6723
	(0.173)		(0.21)	(6.379)	(2.51)		(2.748)
1st Lag of FDI to GDP Ratio	-0.0062		0.0266	()	0.1844		0.1566
	(0.041)		(0.037)		(0.835)		(0.766)
1st Lag of Trade to GDP Ratio	-0.1359		-0.0475	6.4443	-4.4655		-3.5791
	(0.143)		(0.193)	(13.072)	(2.875)		(2.822)
Constant	-0.0153	-0.1381	0.0911	-43.0211	6.4056	-1.3689	17.031
	(0.379)	(0.401)	(0.556)	(85.994)	(8.181)	(3.771)	(10.901)
Observations	145	174	145	50	145	193	145
Groups	42	47	42	17	42	54	42
Instruments	34	38	38	27	41	41	38
AR(2)	0.31	-1.42	-0.98	1.2	0.88	-0.89	0.49
AR(2) p-value	0.758	0.155	0.325	0.229	0.38	0.373	0.626
Hansen Overidentification Test	20.03	26.56	23.02	3.54	28.59	31.1	23.72
Hansen p-value	0.52	0.433	0.519	0.998	0.433	0.313	0.478

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between broad money supply to GDP ratio and real GDP per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see tables A.10 and A.25 in the Appendix.

5.2 Banking Sector Depth & GNI Growth

Another measure of economic growth that is considered when assessing the potential effect of the banking sector depth on the long-term economic growth is the real GNI per capita.

Table 35: Credit to Private Sector to GDP Ratio & Real GNI per Capita

Model Number	87	342	102	358
Country Group	NRBC	NRBC	Other	Other
Dependent Variable	Real GNI per Capita	Real GNI per Capita	Real GNI per Capita Growth Rate	Real GNI per Capita Growth Rate
Independent Variables				
1st Lag of Initial Real GNI per Capita	0.8829*** (0.14)	0.8595*** (0.105)	-5.5953*** (1.999)	-1.2903 (0.931)
Credit to Private Sector to GDP Ratio	0.2339** (0.104)	0.0130** (0.006)		
1st Lag of Credit to Private Sector to GDP Ratio				-0.0995** (0.05)
2nd Lag of Credit to Private Sector to GDP Ratio			3.2581*** (1.169)	
Credit to Private Sector to GDP Ratio Squared		-0.0001* (0)		
1st Lag of Credit to Private Sector to GDP Ratio Squared				0.0008** (0)
1st Lag of Gross Secondary School Enrolment Rate	-0.0819 (0.355)	0.0422 (0.188)	9.096*** (3.361)	3.6485*** (1.377)
1st Lag of Inflation Rate				1.0458 (1.214)
1st Lag of Government Consumption to GDP Ratio				1.0241 (2.079)
1st Lag of FDI to GDP Ratio				-0.1658 (0.579)
1st Lag of Trade to GDP Ratio				-0.1053 (1.173)
Constant	0.4542 (0.805)	0.8462 (0.978)	5.0946 (10.466)	-2.9428 (5.043)
Observations	146	146	337	306
Groups	31	31	81	77
Instruments	28	31	31	69
AR(2)	-1.23	-1.44	0.81	0.4
AR(2) p-value	0.22	0.15	0.42	0.686
Hansen Overidentification Test	18.54	16.76	17.67	55.97
Hansen p-value	0.421	0.669	0.609	0.438

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between credit to private sector to GDP ratio and real GNI per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.11 and A.26 in the Appendix.

Table 35 reports the results of the models considering the connection between the credit to private sector to GDP ratio and the real GNI per capita for the NRBC and the other countries groups. The findings of model number 87 suggest that a 1% surge in the credit to private sector to GDP ratio increases the level of real GNI per capita by 0.234% in the NRBC group. By including the square of the credit to private sector to GDP ratio in model number 342, the effect of a 1% climb on the level of credit to private sector to

GDP ratio on the real GNI per capita in the NRBC group falls to 0.013%.[27] In the group of other countries, model 102 demonstrates that a higher credit to private sector to GDP ratio accelerates the real GNI per capita growth rate. Model number 358, in contrast, suggests a negative and non-monotonic relationship between the two variables. Statistically, however, the coefficient of the credit to private sector to GDP ratio in model number 102 is more significant than that of model number 358.

Table 36: Bank Assets to GDP Ratio & Real GNI per Capita

Model Number	362	118	120
Country Group	NRBC	Other	
Dependent Variable	Real GNI per Capita	Real GNI per Capita Growth Rate	
Independent Variables			
1st Lag of Initial Real GNI per Capita	0.6713***	-1.1271	-2.4937
	(0.099)	(1.614)	(2.269)
1st Lag of Bank Assets to GDP Ratio	-0.0055***		
	(0.002)		
2nd Lag of Bank Assets to GDP Ratio			1.0703**
			(0.517)
3rd Lag of Bank Assets to GDP Ratio		1.6714**	
		(0.678)	
1st Lag of Bank Assets to GDP Ratio Squared	0**		
	(0)		
1st Lag of Gross Secondary School Enrolment Rate	0.4032**	0.7466	3.4873
	(0.144)	(2.825)	(3.354)
1st Lag of Inflation Rate	-0.1835*		3.726***
	(0.103)		(1.377)
1st Lag of Government Consumption to GDP Ratio	-0.3563		3.3562
	(0.255)		(2.506)
1st Lag of FDI to GDP Ratio	0.016		1.0578**
	(0.034)		(0.514)
1st Lag of Trade to GDP Ratio	0.2733		-0.1611
	(0.34)		(2.279)
Constant	0.9076	7.1284	-4.7785
	(2.132)	(4.646)	(9.907)
Observations	103	203	230
Groups	27	70	70
Instruments	30	23	56
AR(2)	-0.25	0.8	0.39
AR(2) p-value	0.805	0.421	0.694
Hansen Overidentification Test	12.52	18.01	48.99
Hansen p-value	0.708	0.323	0.28

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between bank assets to GDP ratio and real GNI per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.12 and A.27 in the Appendix.

The results of the models that estimate the potential link between the bank assets to GDP ratio and the real GNI per capita provide more evidence of such a relationship in

[27] Note that the coefficients of model numbers 87 and 342 are not comparable as the banking sector depth explanatory variable in the former model is included after transforming it to its natural logarithms while the latter model employs the actual values of the variable.

the group of other countries. As Table 36 reports, only one model is relevant in the case of the NRBC group. Model number 362, which employs full conditioning, indicates that the connection between the bank assets to GDP ratio and the real GNI per capita is non-linear with the main coefficient being a relatively small negative number. In the case of the other countries group, model number 118 reveals that a 1% hike in the third lag of the banking assets to GDP ratio results in a 1.671% increase in the real GNI per capita growth rate under simple conditioning. This is while model number 120 under full conditioning suggests that a 1% increase in the second lag of the bank assets to GDP ratio lifts the rate of growth in real GNI per capita by 1.07%. The non-linear models for the other countries group are found to be statistically insignificant.

Table 37: Bank Liabilities to GDP Ratio & Real GNI per Capita

Model Number	122	388	390
Country Group	NRBC	Other	
Dependent Variable	Real GNI per Capita	Real GNI per Capita Growth Rate	
Independent Variables			
1st Lag of Initial Real GNI per Capita	0.989***	-1.2825	-1.8211
	(0.118)	(1.315)	(1.218)
Bank Liabilities to GDP Ratio	0.1475**	-0.1064**	-0.2230***
	(0.058)	(0.050)	(0.079)
Bank Liabilities to GDP Ratio Squared		0.0010*** (0)	0.0019***
			(0.001)
1st Lag of Gross Secondary School Enrolment Rate	-0.2719	3.7699	4.7601**
	(0.325)	(2.334)	(2.168)
1st Lag of Inflation Rate			-0.808
			(0.959)
1st Lag of Government Consumption to GDP Ratio			3.903*
			(2.24)
1st Lag of FDI to GDP Ratio			0.4643
			(0.435)
1st Lag of Trade to GDP Ratio			-0.4093
			(1.923)
Constant	0.6813	-2.5602	-10.0949
	(0.549)	(4.413)	(10.94)
Observations	124	298	263
Groups	28	74	70
Instruments	26	35	65
AR(2)	-1.17	0.45	1.24
AR(2) p-value	0.243	0.651	0.215
Hansen Overidentification Test	18	24.58	51.73
Hansen p-value	0.389	0.429	0.445

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between bank liabilities to GDP ratio and real GNI per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.13 and A.28 in the Appendix.

Table 37 investigates the finance-growth nexus using the bank liabilities to GDP ratio and the real GNI per capita measures. A positive association between the banking sector ratio and the real GNI per capita level is found in the NRBC group according to model

number 122. The models that introduce the square values of the bank liabilities to GDP ratio fail to find any non-monotonic relationship in the context of the NRBC group. For the other countries group, model number 136 illustrates that the total effect of an increase in the bank liabilities to GDP ratio is negative for the long-term economic growth measure. The same conclusion can be drawn from the results of model numbers 388 and 390. All three models report a negative and non-linear relationship between the variables.

Table 38: Money Supply to GDP Ratio & Real GNI per Capita

Model Number	145	153	155	404	407
Country Group	Other	Other Countries		Other	
Dependent Variable	Real GNI per Capita	Real GNI per Capita Growth Rate		Real GNI per Capita Growth Rate	
Independent Variables					
1st Lag of Initial Real GNI per Capita	0.8836***	-2.6731**	-2.5162*	-0.8558	-1.7552**
	(0.083)	(1.144)	(1.291)	(1.023)	(0.756)
1st Lag of Money Supply to GDP Ratio			3.0239**	-0.2338**	
			(1.337)	(0.091)	
2nd Lag of Money Supply to GDP Ratio		3.6548***		0.327***	
		(1.33)		(0.091)	
3rd Lag of Money Supply to GDP Ratio	0.2185**				0.2135**
	(0.089)				(0.086)
1st Lag of Money Supply to GDP Ratio Squared				0.001**	
				(0)	
2nd Lag of Money Supply to GDP Ratio Squared				-0.0016***	
				(0)	
3rd Lag of Money Supply to GDP Ratio Squared					-0.0017***
					(0.001)
1st Lag of Gross Secondary School Enrolment Rate	0.2169	4.3329**	3.5641	3.0245*	2.1625
	(0.158)	(2.022)	(2.178)	(1.555)	(1.385)
1st Lag of Inflation Rate			2.1285		2.2721
			(1.737)		(3.953)
1st Lag of Government Consumption to GDP Ratio			3.6766		1.2213
			(2.4)		(1.774)
1st Lag of FDI to GDP Ratio			-0.0624		-0.2786
			(0.386)		(0.549)
1st Lag of Trade to GDP Ratio			0.4215		1.2449
			(1.373)		(1.394)
Constant	-0.5254	-10.687	-13.5414*	-7.4746	-6.4599
	(0.376)	(12.788)	(6.916)	(10.122)	(4.346)
Observations	297	317	294	317	271
Groups	76	81	77	81	72
Instruments	29	31	61	42	60
AR(2)	-1.62	0.6	1.16	0.94	1.37
AR(2) p-value	0.106	0.55	0.245	0.346	0.169
Hansen Overidentification Test	21.99	25.62	48.21	28.82	50.2
Hansen p-value	0.285	0.179	0.464	0.422	0.311

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between money supply to GDP ratio and real GNI per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.14 and A.29 in the Appendix.

Employing the money supply to GDP ratio as a measure of banking sector depth, the results of the models stated in Table 38 find that the depth of the banking sector is only

important for long-term economic growth in the other countries group. Model number 145 demonstrates that a rise in the third lag of the money supply to GDP ratio results in an increase in the real GNI per capita level in the other countries group. Model numbers 153 and 155 report a similar positive association but with the second and first time lags of the banking sector depth variables respectively. Taking the total effect of the first and second lags of the explanatory variable in model number 404, a positive non-linear relationship is concluded. Under full conditioning, the results of model number 407 suggest that the long-term economic growth is non-linearly linked to the third lag of the money supply to GDP ratio in the other countries group.

Table 39: Broad Money Supply to GDP Ratio & Real GNI per Capita

Model Number	413	415	165	169	421	423
Country Group	Other		NRBC	Other		
Dependent Variable	Real GNI per Capita		Real GNI per Capita Growth Rate	Real GNI per Capita Growth Rate		
Independent Variables						
1st Lag of Initial Real GNI per Capita	1.0426***	1.011***	4.0821	0.6399	1.422	-0.2656
	(0.125)	(0.075)	(5.216)	(1.787)	(1.901)	(1.673)
1st Lag of Broad Money Supply to GDP Ratio					0.3215***	
					(0.072)	
2nd Lag of Broad Money Supply to GDP Ratio	0.0246*	0.02***		5.3105*		0.3519**
	(0.014)	(0.008)		(3.115)		(0.143)
3rd Lag of Broad Money Supply to GDP Ratio			-10.7447**			
			(4.08)			
1st Lag of Broad Money Supply to GDP Ratio Squared					-0.0022***	
					(0)	
2nd Lag of Broad Money Supply to GDP Ratio Squared	-0.0002*	-0.0001***				-0.0024**
	(0)	(0)				(0.001)
1st Lag of Gross Secondary School Enrolment Rate	-0.1914	-0.0751	3.024	-3.1449	-3.6784	-0.4945
	(0.298)	(0.13)	(4.788)	(3.791)	(3.003)	(3.374)
1st Lag of Inflation Rate		1.4201*				26.972**
		(0.854)				(13.107)
1st Lag of Government Consumption to GDP Ratio		0.0206				0.7125
		(0.167)				(4.296)
1st Lag of FDI to GDP Ratio		-0.0321				-0.755
		(0.055)				(0.958)
1st Lag of Trade to GDP Ratio		-0.0608				-1.7743
		(0.165)				(2.482)
Constant	-0.0906	-0.0324	-6.2535	-10.7023	-3.2222	0.5887
	(0.289)	(0.623)	(27.475)	(7.538)	(4.087)	(6.877)
Observations	139	124	47	139	150	124
Groups	37	35	15	37	42	35
Instruments	36	30	15	31	37	30
AR(2)	-1.28	-1.41	-1.17	0.31	-0.31	0.81
AR(2) p-value	0.2	0.157	0.241	0.76	0.758	0.42
Hansen Overidentification Test	24.53	9.88	4.81	19.77	19.05	13.07
Hansen p-value	0.432	0.873	0.569	0.472	0.749	0.667

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between broad money supply to GDP ratio and real GNI per capita. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.15 and A.30 in the Appendix.

Similarly to the findings of the models that consider the money supply to GDP ratio as a measure of banking sector depth, the models that employ the broad money supply to GDP ratio in Table 39 provide more evidence in favour of the finance-growth relationship for the other countries group than for the NRBC group. Model number 169

illustrates that higher levels of banking sector depth in economies that belong to the other countries group stimulate future economic growth. The non-monotonic models also report comparable results. Applying the simple conditioning, model number 421 reveals that the link between the first lag of the broad money supply to GDP ratio and the real GNI per capita growth rate is positive and non-linear in the other countries group. Similar results for the second lag of the broad money supply to GDP ratio indicator are found in model numbers 413, 415 and 423. The only model that provides any results in relation to the NRBC group is model number 165. The model suggests that the third lag of the broad money supply to GDP ratio is negative for economic growth. Despite the statistical significance of the model, it is important to highlight that the results are based on the data of 15 countries with a total of only 47 observations.

5.3 Banking Sector Depth & Investment

This subsection examines the results of the models on the potential relationship between the five banking sector depth proxies and the investment ratios in the NRBC and the other countries groups.

Table 40: Credit to Private Sector to GDP Ratio & Investment to GDP Ratio

Model Number	433	186	437	439
Country Group	NRBC	Other	Other	
Dependent Variable	Private Investment to GDP Ratio	Private Investment to GDP Ratio	Private Investment to GDP Ratio	
Independent Variables				
1st Lag of Initial Real GDP per Capita	0.1131	-0.0814	0.0173	0.0237
	(0.083)	(0.078)	(0.075)	(0.079)
1st Lag of Private Investment to GDP Ratio	0.432***	0.493***	0.4369***	0.6103***
	(0.14)	(0.126)	(0.125)	(0.141)
Credit to Private Sector to GDP Ratio	-0.0518**	0.2293**	0.0151*	0.0108*
	(0.022)	(0.114)	(0.008)	(0.005)
Credit to Private Sector to GDP Ratio Squared	0.0008**		-0.0001*	-0.0001**
	(0)		(0)	(0)
1st Lag of Gross Secondary School Enrolment Rate	0.5785*	0.0304	0.042	-0.0609
	(0.299)	(0.102)	(0.081)	(0.106)
1st Lag of Inflation Rate				0.0459
				(0.184)
1st Lag of Government Consumption to GDP Ratio				0.2451
				(0.17)
1st Lag of FDI to GDP Ratio				0.0476
				(0.065)
1st Lag of Trade to GDP Ratio				-0.0123
				(0.341)
Constant	0.7455	0.9236*	0.7896	0.3114
	(1.709)	(0.481)	(0.604)	(1.551)
Observations	128	269	269	238
Groups	32	68	68	65
Instruments	32	40	49	60
AR(2)	-0.06	-1.28	-1.43	-0.75
AR(2) p-value	0.951	0.2	0.154	0.454
Hansen Overidentification Test	12.95	28.83	29.1	37.48
Hansen p-value	0.88	0.474	0.82	0.779

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between credit to private sector to GDP ratio and investment to GDP ratios. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.16 and A.31 in the Appendix.

The models that estimate the link between the credit to private sector to GDP ratio and the investment to GDP ratio find no evidence of any relationship either in the NRBC group or in the other countries group. By replacing the economic growth measure with a private investment to GDP ratio, number of models report statistically significant results, particularly for the other countries group. Under the simple conditioning, model number 186 finds that increasing the credit to private sector to GDP ratio by 1% lifts the ratio of the private investment to GDP by 0.229%. The results of the latter model are confirmed by the non-linear models for the other countries group presented in Table 40. The signs in front of the coefficient associated with the level banking sector depth variables in model numbers 437 and 439 are positive and statistically significant at the 10% test level. In comparison, model number 433 is the only estimator with statistically significant results for the NRBC group. This suggests a negative and non-linear link

between the credit to private sector to GDP ratio and the private investment to GDP ratio. According to model number 433, hiking the ratio of the credit to private sector to GDP ratio by 1% decreases the level of private investment to GDP ratio by 0.052% in the NRBC group.

Table 41: Bank Assets to GDP Ratio & Investment to GDP Ratio

Model Number	192	200	449	451
Country Group	NRBC	NRBC	NRBC	
Dependent Variable	Investment to GDP Ratio	Private Investment to GDP Ratio	Private Investment to GDP Ratio	
Independent Variables				
1st Lag of Initial Real GDP per Capita	-0.015	0.2489*	-0.0157	0.0262
	(0.049)	(0.138)	(0.05)	(0.242)
1st Lag of Investment to GDP Ratio	0.6682***			
	(0.143)			
1st Lag of Private Investment to GDP Ratio		0.3256	0.8179***	0.6154*
		(0.514)	(0.09)	(0.348)
1st Lag of Bank Assets to GDP Ratio			-0.0108***	-0.0171***
			(0.002)	(0.004)
2nd Lag of Bank Assets to GDP Ratio		-0.3935**		
		(0.154)		
3rd Lag of Bank Assets to GDP Ratio	0.102***	0.4749**		
	(0.035)	(0.197)		
1st Lag of Bank Assets to GDP Ratio Squared			0.0001***	0.0001***
			(0)	(0)
1st Lag of Gross Secondary School Enrolment Rate	-0.1701*	-0.0984	0.1446*	0.3716
	(0.088)	(0.296)	(0.078)	(0.251)
1st Lag of Inflation Rate	-0.1266	-0.2537		-0.2349
	(0.105)	(0.445)		(0.216)
1st Lag of Government Consumption to GDP Ratio	-0.2824**	-0.4381		-0.6598**
	(0.128)	(0.408)		(0.268)
1st Lag of FDI to GDP Ratio	-0.0483**	0.2128*		0.0358
	(0.023)	(0.12)		(0.112)
1st Lag of Trade to GDP Ratio	-0.1266	-0.6794		-0.1645
	(0.111)	(0.793)		(0.475)
Constant	2.9311***	4.3195	0.1586	1.9579
	(0.797)	(2.887)	(0.431)	(1.564)
Observations	89	61	122	98
Groups	36	25	31	29
Instruments	28	30	31	33
AR(2)	-0.16	-0.68	1.17	0.7
AR(2) p-value	0.872	0.497	0.242	0.482
Hansen Overidentification Test	20.15	12.42	10.09	11.93
Hansen p-value	0.214	0.774	0.966	0.851

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between bank assets to GDP ratio and investment to GDP ratios. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.17 and A.32 in the Appendix.

Turning to the models that estimate the possible effect of the bank assets to GDP ratio as a measure of banking sector depth and the investment to GDP ratios, the results presented in Table 41 provide evidence solely for the NRBC group. For every 1% increase in the third lag of the bank assets to GDP ratio, the total investment to GDP ratio is expected to rise by 0.102% in the NRBC group according to model number 192. The latter applies full conditioning and the coefficient associated with the main independent variable is statistically significant at the 99% confidence level. Similarly,

model number 200 demonstrates that the total effect of higher second and third lags of the banking sector depth indicator for the private investment to GDP ratio is positive in the NRBC group. By incorporating the squared values of the explanatory variable in the model equation, however, the sign of the coefficient associated with the bank assets to GDP ratio variable becomes negative. Model number 449 that adopts simple conditioning as well as model number 451 that employs the full conditioning, show that the link is negative and non-linear. All the models that estimate the relationship in the other countries group are found to be statistically insignificant.

Table 42: Bank Liabilities to GDP Ratio & Investment to GDP Ratio

Model Number	207	221
Country Group	NRBC	Other
Dependent Variable	Investment to GDP Ratio	Private Investment to GDP Ratio
Independent Variables		
1st Lag of Initial Real GDP per Capita	-0.0148 (0.07)	-0.0309 (0.192)
1st Lag of Investment to GDP Ratio	0.7874*** (0.095)	
1st Lag of Private Investment to GDP Ratio		0.3737** (0.19)
1st Lag of Bank Liabilities to GDP Ratio	-0.103*** (0.033)	
3rd Lag of Bank Liabilities to GDP Ratio		-0.0825** (0.042)
1st Lag of Gross Secondary School Enrolment Rate	-0.0484 (0.091)	0.0949 (0.156)
1st Lag of Inflation Rate		-0.2181 (0.389)
1st Lag of Government Consumption to GDP Ratio		0.1777 (0.191)
1st Lag of FDI to GDP Ratio		0.0768 (0.092)
1st Lag of Trade to GDP Ratio		-0.1956 (0.217)
Constant	1.1501** (0.492)	2.0591* (1.068)
Observations	176	132
Groups	42	47
Instruments	35	42
AR(2)	1.33	-0.93
AR(2) p-value	0.184	0.354
Hansen Overidentification Test	26.81	25.31
Hansen p-value	0.365	0.71

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between bank liabilities to GDP ratio and investment to GDP ratios. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.18 and A.33 in the Appendix.

To examine whether a connection prevails between the banking sector depth measured by the bank liabilities to GDP ratio and the investment to GDP ratios as proxies for

economic growth, the models in Table 42 are estimated. In the case of the NRBC, the findings of model number 207 provide evidence of a negative association between the first lag of the banking sector depth variable and the total investment to GDP ratio. A 1% fall in the current level of the banking sector depth indicator, according to the last model, leads to an increase in the level of total investment to GDP ratio. In terms of the relationship between the bank liabilities to GDP ratio and the private investment to GDP ratio, only one model reports a statistically significant link between the two variables in the other countries group. Model number 221 indicates that the third lag of the banking sector depth is negatively related to the private investment to GDP ratio.

Table 43: Money Supply to GDP Ratio & Investment to GDP Ratio

Model Number	473	237
Country Group	NRBC	Other
Dependent Variable	Investment to GDP Ratio	Private Investment to GDP Ratio
Independent Variables		
1st Lag of Initial Real GDP per Capita	-0.0006 (0.082)	0.0059 (0.101)
1st Lag of Investment to GDP Ratio	0.8322*** (0.105)	
1st Lag of Private Investment to GDP Ratio		0.5569*** (0.18)
Money Supply to GDP Ratio	0.027** (0.01)	0.4531** (0.217)
1st Lag of Money Supply to GDP Ratio	-0.0212** (0.009)	-0.4464* (0.259)
2nd Lag of Money Supply to GDP Ratio		0.1271* (0.077)
Money Supply to GDP Ratio Squared	-0.0002** (0)	
1st Lag of Money Supply to GDP Ratio Squared	0.0002** (0)	
1st Lag of Gross Secondary School Enrolment Rate	0.0163 (0.135)	-0.0797 (0.09)
1st Lag of Inflation Rate		-0.0175 (0.199)
1st Lag of Government Consumption to GDP Ratio		0.3046 (0.188)
1st Lag of FDI to GDP Ratio		0.0428 (0.038)
1st Lag of Trade to GDP Ratio		0.0545 (0.165)
Constant	0.3031 (0.459)	-0.1505 (0.78)
Observations	204	230
Groups	45	65
Instruments	41	58
AR(2)	0.73	-0.74
AR(2) p-value	0.463	0.46
Hansen Overidentification Test	30.79	30.32
Hansen p-value	0.28	0.91

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between money supply to GDP ratio and investment to GDP ratios. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.19 and A.34 in the Appendix.

Employing the money supply to GDP ratio as a banking sector depth proxy, model number 473 demonstrates that the total effect of a higher current and first lag money supply to GDP ratio is positive for the level of total investment to GDP in the NRBC group. The latter model suggests a non-linear relationship between the two variables as the squared values of the money supply to GDP ratio are statistically significant at a 95% confidence level. For the other countries group, all the models that estimate the relationship using the level and the non-linear specification report statistically

insignificant results. Replacing the total investment to GDP ratio with the private investment to GDP ratio, model number 237 indicates that the relationship between the money supply to GDP and the economic growth proxy is positive for the other countries group when the total effect approach is used (i.e. the sum of all the coefficients associated with the current and time lags of the explanatory variable under consideration). The models for the NRBC group fail to report any meaningful results.

Table 44: Broad Money Supply to GDP Ratio & Investment to GDP Ratio

Model Number	242	244	245	246	502
Country Group	NRBC	Other			Other
Dependent Variable	Investment to GDP Ratio	Investment to GDP Ratio			Private Investment to GDP Ratio
Independent Variables					
1st Lag of Initial Real GDP per Capita	-0.0971	-0.1183*	-0.0787*	-0.0901	-0.0385
	(0.201)	(0.063)	(0.047)	(0.09)	(0.226)
1st Lag of Investment to GDP Ratio	0.983***	0.6391***	0.4722***	0.508**	
	(0.284)	(0.201)	(0.168)	(0.204)	
1st Lag of Private Investment to GDP Ratio					0.6259***
					(0.218)
Broad Money Supply to GDP Ratio			0.5163***		
			(0.165)		
1st Lag of Broad Money Supply to GDP Ratio	-0.4559**		-0.428**		
	(0.189)		(0.195)		
2nd Lag of Broad Money Supply to GDP Ratio				0.4201**	
				(0.203)	
3rd Lag of Broad Money Supply to GDP Ratio		0.3516*			0.0323**
		(0.186)			(0.014)
3rd Lag of Broad Money Supply to GDP Ratio Squared					-0.0002**
					(0)
1st Lag of Gross Secondary School Enrolment Rate	0.0693	0.1227	0.168	0.0088	-0.0303
	(0.146)	(0.136)	(0.116)	(0.136)	(0.175)
1st Lag of Inflation Rate	0.1039		-0.5867	-0.0091	
	(0.43)		(0.427)	(0.548)	
1st Lag of Government Consumption to GDP Ratio	0.4652		0.0121	0.314	
	(0.536)		(0.122)	(0.277)	
1st Lag of FDI to GDP Ratio	-0.0101		-0.0747*	-0.0125	
	(0.091)		(0.044)	(0.08)	
1st Lag of Trade to GDP Ratio	0.1046		-0.1229	-0.5205**	
	(0.357)		(0.149)	(0.252)	
Constant	0.6161	0.2832	1.7552***	1.7537**	0.5804
	(1.807)	(0.608)	(0.664)	(0.802)	(1.353)
Observations	50	163	124	143	94
Groups	21	36	44	41	22
Instruments	30	37	40	38	26
AR(2)	-0.21	-1.24	-0.78	-1.56	-1.29
AR(2) p-value	0.835	0.216	0.436	0.119	0.199
Hansen Overidentification Test	6.09	22.83	21.18	26.59	4.57
Hansen p-value	0.987	0.642	0.683	0.324	0.995

The table reports the regression results of the selected Dynamic Panel System GMM models investigating the relationship between broad money supply to GDP ratio and investment to GDP ratios. The models employ data for the period from 1964 to 2013 that are averaged over ten non-overlapping five-year periods. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated. For more details about model specifications and the full results, see Tables A.20 and A.35 in the Appendix.

The final set of models examines the finance-growth nexus by regressing the total investment to GDP ratio and the private investment to GDP ratio on the broad money supply to GDP ratio. In the NRBC group, the findings of model number 242 illustrate

that a higher first lag of broad money supply to GDP ratio results in a lower level of total investment to GDP ratio. This negative relationship is the only statistically significant relationship between the two variables in the NRBC group. Model number 244 implies that under simple conditioning the link between the third lag of the broad money supply to GDP ratio and the total investment to GDP ratio is positive for the group of other countries. The findings of model number 244 in terms of the type of relationship between the two variables in general are confirmed by model numbers 245 and 246. In the former model, the contemporaneous and first lag of the banking sector depth variable are statistically significant while in the latter it is the second lag. The results of the models that estimate the relationship between the banking sector depth proxy and the private investment to GDP ratio in the NRBC group as well as in the other countries group report statistically insignificant results.

5.4 Results Synthesis

This subsection synthesises the results of all the statistically significant models estimated in this project. In doing so, the results for each country group are synthesised and compared along three relationship dimensions. The first is the type of relationship between each banking sector depth measure and the economic growth indicators. The second dimension is the time lags between the change in the banking sector depth measure and the effect on the economic growth, while the third is the magnitude of the finance-growth relationship.

5.4.1 Synthesising the Relationship Type

Table 45 reports whether the relationship between the banking sector depth and economic growth variables is positive or negative for the most statistically significant and valid models. In the NRBC group, the table shows that out of 23 models, 13 are reporting positive relations between the variables. This is compared to 32 out of 38 models that suggest positive links in the case of the other countries group. In the latter group, six out of eight models reporting negative relationships are using the bank liabilities to GDP ratio as the measure of banking sector depth. Other combinations of banking sector depth measures and economic growth indicators using the linear and non-linear models' specification are found to be statistically insignificant. This is

particularly evident in models using the investment to GDP as a proxy for economic growth.

Table 45: Summary of the Results: Relationship Type between Banking Sector Depth & Economic Growth

			NRBC					Others				
			CP	BA	BL	M	BM	CP	BA	BL	M	BM
Real GDP per Capita	Simple Conditioning	Linear	+	+	.	.	.	.	.	.	+	.
		Non-Linear	+	.	.	-	.	.	.	.	.	+
	Full Conditioning	Linear	.	.	+	.	.	.	.	.	.	+
		Non-Linear	.	.	-	.	.	.	.	.	.	+
Real GDP per Capita Growth	Simple Conditioning	Linear	.	+	.	.	.	.	+	.	+	.
		Non-Linear	.	.	.	.	.	.	.	-	.	+
	Full Conditioning	Linear	.	-	+	.	+	.	+	.	+	+
		Non-Linear	.	.	.	.	.	.	.	.	+	+
Real GNI per Capita	Simple Conditioning	Linear	+	.	+	.	.	.	.	.	+	.
		Non-Linear	+	.	.	.	.	.	.	.	.	+
	Full Conditioning	Linear	.	.	.	.	.	.	.	.	.	.
		Non-Linear	.	-	.	.	.	.	.	.	.	+
Real GNI per Capita Growth	Simple Conditioning	Linear	.	.	.	.	-	+	+	.	+	+
		Non-Linear	.	.	.	.	.	.	.	-	+	+
	Full Conditioning	Linear	.	.	.	.	.	.	+	-	+	.
		Non-Linear	.	.	.	.	.	-	.	-	+	+
Investments to GDP	Simple Conditioning	Linear	.	.	-	.	.	.	.	.	.	+
		Non-Linear	.	.	.	+	.	.	.	.	.	.
	Full Conditioning	Linear	.	+	.	.	-	.	.	.	.	+
		Non-Linear	.	.	.	.	.	.	.	.	.	.
Private Investments to GDP	Simple Conditioning	Linear	.	.	.	.	.	+	.	.	.	.
		Non-Linear	-	-	.	.	.	+	.	.	.	+
	Full Conditioning	Linear	.	+	.	.	.	.	.	-	+	.
		Non-Linear	.	-	.	.	.	+	.	.	.	.
Number of Positive Relationships			4	4	3	1	1	4	4	0	10	14
Number of Negative Relationships			1	4	2	1	2	1	0	5	0	0

The table summarises the type of relationships between the economic growth measures and credit to private sector to GDP (CP), bank assets to GDP (BA), bank liabilities to GDP (BL), money supply to GDP (M), and broad money supply to GDP (BM) ratios using linear and non-linear models with different conditioning. In models with simple conditioning, the relationship is controlled for the initial level of economic growth measure and the education variable. This is while under full conditioning, the models include the simple conditioning variables plus measures of inflation, government consumption, trade openness, and foreign investment.

When considering the findings of the estimators for the NRBC group, the models employing the credit to private sector to GDP ratio reveal positive finance-growth relationships in four out of five models. This is compared to three out of five in the case of the estimators using the bank liabilities to GDP ratio as a banking sector proxy. In contrast, the models including broad money supply to GDP ratio show that the

development of the banking sector is harmful for long-term economic growth in two out of the three models reported.

For the group of other countries, all of the estimators that use the bank assets to GDP ratio, the money supply to GDP ratio, and the broad money supply to GDP ratio report positive associations between the banking sector depth measures and the economic growth proxies. The results of the models employing the credit to private sector to GDP ratio are along the same lines, with 4 of the 5 models showing a positive link between the two variables. The exception in the case of the other countries group, is the findings of the estimators that employ the banking liabilities to GDP ratio as an explanatory variable. In all of the five statistically significant models the results indicate that a higher level of banking liabilities to GDP ratio is negative for economic growth.

5.4.2 Synthesising the Relationship Time Lag

A synthesis of the findings with respect to the time lag between a change in the banking sector depth measure and its effect on long-term economic growth proxies is presented in Table 46. The table states the number of time periods for the same models presented in Table 45.

Table 46: Summary of the Results: Time Lag between Banking Sec. Deepening & its Effect on Economic Growth

			NRBC					Others				
			CP	BA	BL	M	BM	CP	BA	BL	M	BM
Real GDP per Capita	Simple Conditioning	Linear	1	3							0	
		Non-Linear	1			2						2
	Full Conditioning	Linear			1							2
		Non-Linear			0							2
Real GDP per Capita Growth	Simple Conditioning	Linear		3					0		2	
		Non-Linear								3		1
	Full Conditioning	Linear		1	0		2		3		2	2
		Non-Linear									2	2
Real GNI per Capita	Simple Conditioning	Linear	0		0						3	
		Non-Linear	0									2
	Full Conditioning	Linear										
		Non-Linear		1								2
Real GNI per Capita Growth	Simple Conditioning	Linear					3	2	3		2	2
		Non-Linear								0	1	1
	Full Conditioning	Linear							2	1	1	
		Non-Linear						1		0	3	2
Investments to GDP	Simple Conditioning	Linear			1							3
		Non-Linear				0						
	Full Conditioning	Linear		3			1					0
		Non-Linear										
Private Investments to GDP	Simple Conditioning	Linear						0				
		Non-Linear	0	1				0				3
	Full Conditioning	Linear		2						3	0	
		Non-Linear		1				0				
Average No. of Time Periods			0.4	1.9	0.4	1.0	2.0	0.6	2.0	1.4	1.6	1.9

The table summarises the time lag between the cause and effect in the relationships among the economic growth measures and credit to private sector to GDP (CP), bank assets to GDP (BA), bank liabilities to GDP (BL), money supply to GDP (M), and broad money supply to GDP (BM) ratios using linear and non-linear models with different conditioning. In models with simple conditioning, the relationship is controlled for the initial level of economic growth measure and the education variable. Under full conditioning, the models include the simple conditioning variables plus measures of inflation, government consumption, trade openness, and foreign investment.

The average lag periods reported by all the models assessing the finance-growth nexus for the NRBC group is 1.17, as compared to 1.58 for the other countries group.[28] In the case of the NRBC group only, the time lag average for the models using the credit to

[28] Note that the time lag averages are not empirical estimates of the lag between the cause and effect in the finance-growth relationships. The average time lags are reported here to compare in general the time length between the cause and effect for each country group and between the different banking sector depth proxies as discussed below.

private sector to GDP ratio and the bank liabilities to GDP ratio is 0.40. In contrast, the average time lag for the estimators that use the bank assets to GDP ratio and the broad money supply to GDP ratio are 1.88 and 2 respectively.

As shown in Table 46, the average time period between the change in credit to private sector to GDP ratio and economic growth is 0.60 for the group of other countries. This is while the average time length for the models including the bank assets to GDP ratio as independent variable is the highest for the group of other countries at two time lags.

5.4.3 Synthesising the Relationship Magnitude

This subsection summarises the effect of the association between the banking sector depth measures and the long-term economic growth variables. Firstly, the magnitude of the relationships between the banking sector depth measures and each economic growth variable are compared for each country group. Secondly, the average total effects of five financial development indicators on each economic growth proxy are reported for each country group. Finally, the average total effects are compared for each country group.

Table 47 reports the relationship coefficients for the finance-growth models discussed in the Results Synthesis section. For the models that include more than one time lag of the banking sector depth measure, the total effect is reported instead. When considering the models that assess the influence of the five financial development proxies on the level of the real GDP per capita, the effect of the banking assets to GDP ratio is the highest among the level models for the NRBC group at 0.30. This is while the lowest for the NRBC group is the main explanatory variable coefficient of the model employing the credit to private sector to GDP ratio. The values of the total effect in the models using the squared values of the banking sector depth measures in the same country group range from -0.02 to 0.02. In comparison, all the models that estimate the effect of financial development on the level of real GDP per capita in the other countries group report positive values extending from 0.18 to 0.28 for the level models and are around 0.02 for the non-linear models.

Table 47: Summary of the Results: Total Effect of Banking Sector Deepening on Economic Growth

			NRBC					Others				
			CP	BA	BL	M	BM	CP	BA	BL	M	BM
Real GDP per Capita	Simple Conditioning	Linear	0.03	0.30	.	.	.	.	.	.	0.18	.
		Non-Linear	0.02	.	.	-0.02	.	.	.	.	.	0.02
	Full Conditioning	Linear	.	.	0.10	.	.	.	.	.	.	0.28
		Non-Linear	.	.	-0.02	.	.	.	.	.	.	0.02
Real GDP per Capita Growth	Simple Conditioning	Linear	.	4.97	.	.	.	.	1.53	.	3.16	.
		Non-Linear	.	.	.	.	.	.	.	-0.15	.	0.27
	Full Conditioning	Linear	.	-1.67	1.68	.	8.79	.	0.73	.	3.03	6.93
		Non-Linear	.	.	.	.	.	.	.	.	0.10	0.35
Real GNI per Capita	Simple Conditioning	Linear	0.23	.	0.15	.	.	.	.	.	0.22	.
		Non-Linear	0.01	.	.	.	.	.	.	.	.	0.02
	Full Conditioning	Linear	.	.	.	.	.	.	.	.	.	.
		Non-Linear	.	-0.01	.	.	.	.	.	.	.	0.02
Real GNI per Capita Growth	Simple Conditioning	Linear	.	.	.	.	-10.7	3.26	1.67	.	3.65	5.31
		Non-Linear	.	.	.	.	.	.	.	-0.11	0.09	0.32
	Full Conditioning	Linear	.	.	.	.	.	.	1.07	-1.02	3.02	.
		Non-Linear	.	.	.	.	.	-0.10	.	-0.22	0.21	0.35
Investments to GDP	Simple Conditioning	Linear	.	.	-0.10	.	.	.	.	.	.	0.35
		Non-Linear	.	.	.	0.01	.	.	.	.	.	.
	Full Conditioning	Linear	.	0.10	.	.	-0.46	.	.	.	.	0.09
		Non-Linear	.	.	.	.	.	.	.	.	.	.
Private Investments to GDP	Simple Conditioning	Linear	.	.	.	.	.	0.23	.	.	.	.
		Non-Linear	-0.05	-0.01	.	.	.	0.02	.	.	.	0.03
	Full Conditioning	Linear	.	0.08	.	.	.	.	.	-0.08	0.13	.
		Non-Linear	.	-0.02	.	.	.	0.01	.	.	.	.

The table the summarises the total effect of credit to private sector to GDP (CP), bank assets to GDP (BA), bank liabilities to GDP (BL), money supply to GDP (M), and broad money supply to GDP (BM) ratios on the economic growth measures using linear and non-linear models with different conditioning. In models with simple conditioning, the relationship is controlled for the initial level of economic growth measure and the education variable. Under full conditioning, the models include the simple conditioning variables plus measures of inflation, government consumption, trade openness, and foreign investment.

Substituting the dependent variable with the real GDP per capita growth rate shows that only the level models in the case of the NRBC group are statistically significant and the total impact of the banking sector depth measures varies from -1.67 to 8.79 with the highest associated with the model utilising the broad money supply to GDP ratio. For the other countries group, the level model that presents the lowest influence of financial development on the real GDP per capita growth rate is the one employing the bank assets to GDP ratio where it is equal to 0.73, while the largest effect is given by the model using the broad money supply to GDP ratio at a value of 6.93. The total effects

on the real GDP per capita growth rate for the squared model for the other countries group range from -0.15 to 0.35.

The impact of the banking sector development on the real GNI per capita level in the NRBC group is 0.32 when the credit to private sector to GDP ratio is employed and 0.15 when the bank liabilities to GDP ratio is used in the simple level models. For the other countries group, the linear models with simple conditioning that include the money supply to GDP ratio suggest a total change of 0.22% in the real GNI per capita level due to a 1% change in the same direction in the value of the explanatory variable. The non-linear models that estimate the relationship between the broad money supply to GDP ratio and the real GNI per capita growth level in the other countries group report a total effect of 0.02.

Among all the models that regress the real GNI per capita growth rate on the five banking sector depth variables in the NRBC group, only the one utilising the broad money supply to GDP ratio reports statistically significant results. The latter level model shows that the relationship coefficient is equal to -10.7. In contrast, the 20 models that use the GNI per capita growth rate as the economic growth measure for assessing the finance-growth nexus in the other countries group report 14 statistically significant relationships. The level models indicate that the total impact of the banking sector development on economic growth varies from -1.02 to 3.65 while the non-monotonic models report that the total effect ranges from -0.22 to 0.35.

The impact of the financial development on the total investment to GDP ratio in the NRBC group is mixed, as two models suggest a positive association and two other models indicate negative links. The total effect range is between -0.46 and 0.10 for the level models and is equal to 0.01 for the models using the squared values of the independent variable. The effect of a change in the level of the banking sector depth and the level of total investment to GDP ratio is positive in the case of the other countries group and extends from 0.09 to 0.35 according to the level models.

Finally, all the non-linear models that assess the influence of the financial development on the level of total private investment to GDP ratio report negative values. The only statistically significant level model, however, indicates that a 1% fall in the bank assets to GDP ratio reduces the level of the total private investment to GDP ratio by 0.08%. The level models that estimate the total influence of the five banking sector depth proxies on the ratio of the total private investment to GDP in the other countries group state values between -0.08 and 0.23. All the non-linear models estimating the same relationships report positive total effect values with the highest associated with the model using the broad money supply to GDP ratio.

To summarise and compare the effect of the different measures of the banking sector depth on the economic growth indicators for each country group, Table 48 is presented. The table provides the average total impact of the banking sector explanatory variables based on the models employing the level and squared values.

Table 48: Summary of the Results: Average Total Effect of Banking Sector Deepening on Economic Growth

		NRBC	Others	Higher Magnitude
Real GDP per Capita	Linear	0.14	0.23	Others
	Non-Linear	-0.01	0.02	Others
Real GDP per Capita Growth	Linear	3.44	3.08	NRBC
	Non-Linear	-	0.14	-
Real GNI per Capita	Linear	0.19	0.22	Others
	Non-Linear	0.00	0.02	Others
GNI per Capita Growth	Linear	-10.74	2.42	NRBC
	Non-Linear	-	0.08	-
Investments to GDP	Linear	-0.15	0.22	Others
	Non-Linear	0.01	-	-
Private Investments to GDP	Linear	0.08	0.09	Others
	Non-Linear	-0.03	0.02	NRBC

The table provides the average total effect of the banking sector depth measures on long-term economic growth for the NRBC group and the other countries group. For each dependent variable, the average total effects of the selected linear and non-linear models are reported. The table also compares the size of the average total effect on each dependent variable for the two country groups.

The average total effect for the level models that set the real GDP per capita level as the dependent variable, is 0.14 for the NRBC group and 0.23 for the other countries group. The results for the non-linear models are -0.01 and 0.02 respectively. This is while, for the models assessing the influence of the real GDP per capita growth rate, the average values are 3.44 for the NRBC group and 3.08 for the other countries group.

The average total effect of the five financial development indicators on the real GNI per capita level is higher for the other countries group than for the NRBC group for the models using the level as well as the squared specifications. For the NRBC group, the average effect of a 1% increase in the banking sector measures (here the broad money supply to GDP ratio) leads to a 10.7% fall in the pace of the real GNI per capita growth

rate while it results in a 2.42% increase in the pace of the same economic growth measure in the case of the other countries group.

Once again, the average total impact of the financial development indicators on the total investment to GDP ratio is negative for the NRBC group at -0.15 and positive for the other countries group at 0.22 when the level models are considered. Finally, the level models that estimate the total influence of the banking sector depth proxies on the total private investment to GDP ratio report average values of 0.08 and 0.09 for the NRBC and the other countries groups respectively. The corresponding values for the non-linear models are -0.03 for the NRBC group and 0.02 for the other countries group.

Table 48 illustrates that the values are positive in six out of ten of the average total effects reported for the NRBC group, while all the 11 average values associated with the other countries group are positive. Comparing the relationship magnitude between the two country groups reveals that the average total effect of a change in the banking sector depth measures on the long-term economic growth for the other countries group is higher in six out of nine instances in which the values for both country groups are available.

6 Discussion

This section answers the research question of this thesis in the light of the findings reported in the previous section. It also discusses the results along the three relationship dimensions in relation to the findings of the finance-growth nexus literature. In addition, the section considers the implications of the results for the NRBC group in general and the GCC countries in particular. Finally, the research contribution, the findings relevance, the level of certainty about the findings, and the research limitations are highlighted.

6.1 Results in Relation to the Literature

Since the publication of King and Levine's (1993a) seminal paper, which shows that the average level of financial development is strongly associated with economic growth

between 1960 and 1989, researchers in the area of the finance-growth nexus started to find increasing evidence in support of the notion that the development of the financial sector promotes long-term economic growth. Few scholars, however, have examined the relationship in the context of the NRBC vis-à-vis the rest of the world countries. Further, the recent research in the finance-growth nexus area suggests that the relationship is non-linear and accordingly an excessive level of financial development can harm long-term economic growth.

This paper intends to answer the following question: *What is the extent to which the banking sector depth is linked to the long-term economic growth in the GCC region?* To do so, over 500 dynamic panel data GMM models are estimated for the NRBC group and the other countries group by using different banking sector depth and economic growth measures. The NRBC group is employed instead of the GCC countries due to the lack of sufficient data of the latter to estimate the finance-growth relationship using the GMM estimator for the dynamic panel data models. The findings of the estimated models are synthesised along three dimensions: relationship type, time lag, and magnitude.

Considering the type of relationship between the banking sector depth and long-term economic growth, the findings show that 56% of the statistically significant relationships for the NRBC group presented in the previous section are positive, while it is 84.2% for the other countries group. At first glance, this would indicate that a positive finding is more prevalent in the countries that are not natural resource-based. The majority of the negative signs are, however, associated with the models using quadratic equations. In fact, 60% and 67% of the negative relationships are associated with the non-linear models for the NRBC group and the other countries group respectively.

The quadratic relationships, in which the coefficient of the explanatory variable is negative while the coefficient of its squared value is positive, suggest that the relationship between the dependent and independent variables is negative to a certain point after which it turns positive. In the NRBC group, such a relationship can be associated with the underdevelopment of the banking sector in some countries.

Compared to the other countries group, all the banking sector depth measures for the NRBC group are on average lower (see Table 26). The findings are similar to those reported by Barajas et al. (2013b) in which there is a negative relationship between financial development—approximated by credit to private sector to GDP—and economic growth in the LIC group. The paper highlights that LICs suffer from shallow financial systems. The average credit to private sector to GDP ratio in 2008 for the LICs is 24%, compared to 47% in the Middle Income Countries and 110% in the High Income Countries, according to the authors.

An underdeveloped banking sector leads to the misallocation of resources in the economy. Establishing financial intermediaries by dedicating financial and human capital as well as setting regulatory bodies requires economic resources. A banking sector that is not performing its financial intermediary role to the extent that justifies the economic resources allocated to it would hinder economic growth. As the level of financial intermediation increases, the banking sector becomes more developed and utilises its allocated resources more efficiently. In addition, the lack of considerable financing transactions in an underdeveloped banking sector would deter the growth in the economic sectors that highly depend on finance. Thus as financial intermediaries expand and develop, the finance-growth nexus starts to turn from negative to positive.

If we consider such non-linear relationships as positive associations—since the development of the banking sector beyond a certain point promotes long-term economic growth—the proportion of the positive relationships reported by models for the NRBC group increases from 56% to 82.6% while it climbs from 84.2% to 94.7% in the case of the other countries group. Since, in the non-monotonic models with a positive coefficient associated with their banking sector depth measures, the relationship turns negative beyond certain levels, it follows that in 82.6% of the models for the NRBC group and 94.7% of the models for the other countries group, the relationship between the banking sector depth and economic growth measures is positive within certain ranges of banking sector depth.

In relation to the time lag between the change in the financial development variable and its effect on long-term economic growth, the findings reported in the previous section demonstrate that the time lag for the NRBC group is shorter than for the other countries group. One explanation perhaps is related once again to the relative underdevelopment of the banking sectors in the NRBC group. Compared to countries where finance is readily available to the various industries, the lower accessibility to financial facilities in countries with underdeveloped banking sectors prevents the economic sectors expanding and undertaking investment projects with high economic added value potential. Accordingly, increasing the level of financial intermediation is expected to have a swifter effect on economic productivity in countries with high potential opportunities that are deferred due to the lack of access to finance.

Another possible explanation is related to the natural resources abundance in the NRBC group. Financial intermediaries in the NRBC group are keen to finance firms operating in the economic sector directly linked to the natural resources which the country has in abundance. This reflects the relative lower risks involved in lending to the firms operating in the well-established natural resource sector—backed by the government in most cases—in comparison with firms that operate in the other economic sectors. Financing projects in the natural resource sector results in economic productivity gains in shorter time periods as the business model is more developed and the financing is often employed to expand the activities. This is while lending to other economic sectors entails longer periods to generate productivity gains and returns on investments.

Concerning the third relationship dimension, the results show that the magnitude of the finance growth relationship is larger for the other countries group than for the NRBC group. This might, to certain extent, be linked to the difference in access to finance in the two country groups. In countries in which funds are available to support entrepreneurs, firms with innovative projects, and new industries with high growth potential, the effect of the development of the banking sector can have greater implications for productivity and economic growth. As stated earlier, banks in the NRBC group tend to be more inclined to finance natural resources-related projects and industries. The latter reflects the bank management's better knowledge of the industry,

the level of maturity of the natural resources sectors, the expectations that the financed projects will generate stable cash flows in short time periods, and the government support and involvement that reduce the risk of default to the bank.

The differences in the nature of the relationship between the banking sector depth and long-term economic growth in the two country groups assessed in this thesis demonstrate that the economic structures of the NRBC influence this relationship. The findings are in line with the broader literature on the natural resource curse, which argues that natural resources hinder the development of other economic sectors and the overall economic growth (see Frankel, 2010, for a literature overview). For instance, the findings of this thesis show that the total effect of the bank sector deepening on long-term economic growth is smaller in the NRBC group vis-à-vis the other country group. Accordingly, this suggests that the banking sectors in the former country group are somewhat less effective in accelerating long-term economic growth than their peers in other countries.

The banking-growth nexus empirical investigation presented in this thesis shows that certain combinations of the banking sector depth proxies and economic growth indicators under the different model specifications yield statistically insignificant results. This is particularly evident when the investment to GDP measure is employed as an economic growth proxy. Further research can be directed to explaining such results when using different combinations of banking sector depth and economic growth measures.

The reported findings in this thesis are different from those provided by the finance-growth nexus literature, by offering alternative conclusions, particularly for the NRBC group. The results are compared to those of four papers closely related to the research question and the methodology employed in this thesis: Beck (2011), Barajas et al. (2013b), Levine et al. (2000), and Arcand et al. (2012).

Beck (2011) is the first and only paper in the finance-growth nexus literature, to the best of the author's knowledge, that focuses on financial deepening in the resources-based

economies. It investigates whether the association between financial development and economic growth varies across countries, depending on the extent to which they depend on natural resources. Beck employs cross-country regression models for the period from 1960 to 2007 and finds no evidence that the finance-growth relationship differs across countries with a degree of natural resource abundance.

In comparison, the results of the estimators provided here show that the total effect of banking sector deepening on long-term economic growth tends to be smaller in the NRBC group than in the other countries group. The different conclusions are related to the differences in the data and method involved in each research. Conclusions derived by Beck (2011) are based on one measure of banking sector depth, namely the credit to private sector to GDP ratio, and one economic growth indicator. In addition, Beck uses a cross-country regression model, as opposed to the dynamic panel data GMM model employed here.

Another paper that is related to the current thesis is that of Barajas et al. (2013b). Their paper considers the effect of financial deepening on economic growth across different regions, income levels, and types of economy. Barajas et al. (2013b) show that economic growth benefits obtained from financial deepening are smaller in the oil exporting countries group and fall continuously with the degree of oil dependence. The authors use data for 146 countries from 1975 to 2000 and adopt the GMM dynamic panel method. The paper also finds that, unlike the other oil exporting countries, the GCC countries behave similarly to the high-income countries and obtain greater economic benefits from financial deepening vis-à-vis the other oil exporting countries.

The conclusion provided by Barajas et al. (2013b) in relation to the size of the financial deepening effect on economic growth for the oil exporting countries relative to the rest of the world, is similar to the findings reported here, in the previous section, where the total effect of a change in the banking sector depth on economic growth is lower on average in the NRBC group than the other countries group. Comparing the signs of the coefficients associated with the credit to private sector and oil exporting countries' dummy interaction term in the models estimated by Barajas et al. (2013b) with the signs

of the total effect of the credit to private sector to GDP ratio reported in Table 45, reveals that the coefficient signs are negative in Barajas et al.'s (2013b) models while the signs of the total effect are mostly positive in the models estimated here.

Levine et al.'s (2000) research is closely related to this thesis in terms of the investigation method adopted. The authors pioneered the use of the GMM estimator for the dynamic panel data models in the area of the finance-growth nexus. Levine et al. include the data for 74 countries in their models and illustrate that the development of financial intermediaries exerts a large, positive impact on economic growth. Their paper reports banking sector development coefficients that range from 2.16 to 4.64 when simple conditioning is employed and 1.52 to 2.92 when the full conditioning is used. This is compared to the total effect of 4.97 for the estimator regressing the real GDP per capita growth rate on the banking sector depth measure with simple conditioning, and ranges from -1.67 to 8.79 for the models utilising full conditioning in the context of the NRBC group. For the other countries group, the models associated with real GDP per capita growth rate as the dependent variable suggest that the total effect of the banking sector development varies from 1.53 to 3.16 for the models with simple conditioning and from 0.73 to 6.93 for estimators with full conditioning. Accordingly, the total effects of banking sector deepening on economic growth varies more in comparison with the coefficients reported by Levine et al. This perhaps is explained by the data range employed in this thesis, which includes data associated with the Global Financial Crisis of 2008-2009.

The final paper that is strongly linked to this thesis is that of Arcand et al. (2012). Following the Global Financial Crisis, the authors explored whether there is a threshold above which the deepening of the banking sector no longer has a positive effect on economic growth. Arcand et al. demonstrate that the statistical significance of the credit to private sector coefficient fades as more recent data are added to the system GMM estimators assessing the finance-growth nexus using linear equations. By adopting quadratic equations instead, the paper shows that the banking sector depth measure becomes statistically significant and suggests that beyond a certain level the relationship

between financial development and long-term economic growth turns from positive to negative.

In contrast, the results reported in the last section illustrate that using the GMM estimator for the dynamic panel data models with similar specifications to those employed by Arcand et al. but using other measures of banking sector deepening, can lead to different results. Out of the 27 quadratic equation models reported in Table 47, 17 estimators demonstrate that the finance-growth nexus is positive up to a certain level beyond which the relationship becomes negative in both the NRBC group and the other countries group. This is while ten estimators suggest an opposite relationship where deepening of the banking sector is initially negative for economic growth but after a certain threshold turns positive. As a percentage of the last ten models, 60% are associated with the NRBC group, hinting at the possible effect of the underdevelopment of the banking sector in some of those countries on the association between financial development and economic growth.

6.2 Implications for the GCC & the NRBC

The findings of the current thesis have a number of implications for countries in the NRBC group. Although in general the results indicate that the deepening of the banking sector promotes long-term economic growth in this group, the relationship can initially be negative. Countries belonging to this group are thus required to assess at which stage of the banking sector development they stand. Underdeveloped as well as overdeveloped banking sectors tend to be harmful for economic growth according to the results. Understanding at what stage of banking sector development a country stands enables the country to decide on the appropriate level of resources and the suitable regulations that would ensure a banking sector development level that is beneficial for economic growth.

Further, the results of the NRBC group estimates illustrate that the time lag between the change in the banking sector depth level and the effect on economic growth is shorter relative to the other countries group. The total effect, however, tends to be lower in the case of the NRBC group. Possible explanations are related to the differences in the

projects financed in each country group due to the natural resources curse. To understand the reasons behind this difference in the nature of the finance-growth relationship in the NRBC group, further research is required in this area.

For the GCC countries, where the levels of banking sector development measures are relatively higher than the averages for the NRBC group (see Table 28), policymakers are expected to assess how the total effect of the banking sector deepening on economic growth can be optimised. Increasing the total effect levels to those of the other countries group involves identifying the economic factors that prevent the banking sector from undertaking its role to the full extent. In addition, scholars and policymakers should investigate the impact of banking sector deepening on the structure of the economy, particularly the development of new industries and economic diversification, which remains a priority for the GCC region.

It is worthwhile emphasising that the bank credit to private sector to GDP ratio is the most employed in the literature due to its focus on the lending activities of banks. Other proxies of the banking sector depth are broader in nature and include intermediation activities that do not stimulate economic activities directly. An example is the broad money supply to GDP measure, which includes all the bank deposits with the central bank. Deposits with the central bank are unlikely to accelerate economic activities and investments at the same magnitude as direct lending to the private sector. Accordingly, the results associated with the banking-growth relationship models using different proxies vary but policymakers ought to give priority to the ones employing the bank credit to private sector to GDP ratio.

6.3 Contribution to the Literature & Policy

This thesis contributes to the development of the finance-growth nexus literature in a number of ways. Firstly, it is the first to investigate in depth the relationship between banking sector development and long-term economic growth in the NRBC group. Beck's (2011) is the only other research in the literature that considers the NRBC as a separate group and assesses whether its degree of dependence on natural resources influences the finance-growth relationship. The latter employs one banking sector depth

measure and one economic growth proxy in a simple cross-country regression model. This is compared to various models that use different combinations of five banking sector depth variables and four economic growth indicators.

Secondly, the thesis utilises the dynamic panel data GMM approach in its investigation. Despite the fact that the method became standard in the finance-growth nexus literature, no other research has applied it to the GCC countries or the NRBC group in general. The papers that consider the relationship in the GCC region are those of Chuah and Thai (2004) and Hamdi et al. (2012). Those papers focus on researching the existence of the finance-growth nexus and the direction of causality in the region by applying time series analysis methods in their inquiry.

Finally, the thesis contributes to the literature by comparing the nature of the finance-growth relationship along three dimensions in the NRBC group and the other countries group. Scholars in the field have compared the relationship among different countries and regions. The work of Barajas et al. (2013b) is an example where the nature of the relationship is examined across regions, income levels, and types of economy. Barajas et al. (2013b), however, limit their economy classification to oil exporting and non-oil exporting countries. Further, the literature in general is concerned with the type and magnitude of the relationship in the countries under consideration. This thesis introduces the time lag dimension to the assessment of the relationship. This is particularly relevant when comparing the finance-growth nexus for a specific country or region in relation to another. The time lag dimension enables researchers as well as policymakers to identify the time required for a change in the level of the banking sector depth to influence long-term economic growth.

6.4 Research Relevance & Limitations

In relation to the relevance of the findings in this thesis, they contribute to the development of the finance-growth nexus literature in the context of the NRBC and put forward a number of questions for further research. For policymakers, the findings are relevant as all the GCC countries strive to increase their long-term economic growth rates and diversify their economies away from the hydrocarbon sector. Understanding

the nature of the relationship in economies with similar economic structures and a dependency on natural resources allows policymakers to take a more informed decision with respect to the development of the banking sectors.

The use of the GMM estimator for the dynamic panel data models, as well as employing different measures of banking sector development and economic growth, provides a greater degree of certainty about the evidence offered by the models. The dynamic panel GMM models are designed to address the econometric problems associated with the "unobserved country-specific effects and joint endogeneity of the explanatory variables in the lagged-dependent-variable models, such as growth regressions" (Levine et al., 2000, p.33). This provides greater confidence in the results of the dynamic panel GMM estimators over the OLS and cross-country models traditionally, though not recently, employed in the finance-growth nexus literature. Further, the use of the models with different combinations of banking sector depth and economic growth enables a greater degree of certainty regarding the findings and subsequent conclusions. In the literature, scholars tend to limit their variables to fewer banking sector developments and one or two economic growth proxies.

It is important to highlight that the findings are not free of contradictions. Examining the models that regress the various economic growth variables on the banking liabilities to GDP ratio in the other countries group reveals that the relationship is consistently negative. This is opposed to the general findings for the other models for the same country group. Such contradictory findings require further research to explain them.

In terms of the study limitations, few points are worth underlining. Firstly, the lack of sufficient data for the GCC countries prevents the research from considering finance-growth models that focus on those countries. In fact, the thesis estimates the number of dynamic panel GMM models that employ the NRBC group data and uses two interaction explanatory variables: one is between the banking sector depth measure and a GCC country's dummy variable, and the other is between the banking sector depth measure and a dummy variable for the rest of the NRBC group. Those estimators are not reported due to model misspecification problems related to the limited data

employed. As more data for the GCC countries become available and more advanced econometric models are developed, further research should overcome such obstacles and be able to estimate the long-term finance-growth econometric models that are specific to the GCC countries.

A limitation associated with the empirical models used in this thesis is the selection of the time lags of banking sector depth explanatory variables. The selection of the time lag length here reflects technical as well as practical aspects. Technically, the inclusion of more time lags in the empirical models results in a loss in the degrees of freedom. From a practical point of view, the current and three time lagged banking sector depth variables employed cover a period of 20 years. As financial intermediaries generally extend loans to firms for shorter tenures with expectations that the borrower's expansion in activities or new project would generate cash flows during the life of the loan, the three time lags ought to be sufficient to capture any relationship between the sector depth and economic growth. Having said that, employing statistical techniques to determine the appropriate time lags length used in each model could well improve the rigour of the research process adopted here.

Another element that can be improved in the current research is the inclusion of a background section which examines and compares the levels of banking sector depth measures in each country group and among countries within each group. Such analysis would inform the research about the differences in the levels of financial development, highlight the set of economies with comparable financial development characteristics, and put forward questions for further research.

7 Further Research

The findings of the thesis demonstrate the differences in the magnitude of the total effect of banking sector deepening on long-term economic growth. The total effect in the NEBC group tends to be lower than in the other countries group. In explaining the phenomenon, the discussion above focuses of the supply side of the market. It is possible, however, that the lower total effect levels of the banking sector development

on long-term economic output are associated with the demand side. Borrowers in the NRBC group might allocate resources suboptimally so that the effect on economic growth is not realised to its full extent.

The findings also show that the time lag between changing the level of banking sector development and its impact on economic growth is shorter in the NRBC group. The above discussion suggests that banks in the NRBC channel funds to projects and corporations within and around the natural resource sectors. Such lending, it is argued, will have a more immediate effect on economic growth as the funds are employed for expanding existing activities and industries. This is compared to bank lending targeting innovative projects and new industries that often require some time before having an impact on economic output; this, however, remains a hypothesis. Thus the area needs further research to determine what the factors are behind the differences in the relationship time lag in each country group.

Researchers considering employing the same empirical research method presented in this thesis can improve the research process by introducing statistical tests to determine the appropriate time lag length to be used when estimating the finance-growth nexus models. The tests are needed to overcome the issue of arbitrary time lag length selection for the main explanatory variable in the models.

Another area that requires further research is related to the non-linear negative relationship in the NRBC group. The findings associated with models estimating the quadratic relationship between finance and growth in the NRBC illustrate that, for a number of the banking sector depth measures, the relationship with long-term economic growth is negative up to a certain level of banking sector deepening, after which the relationship becomes positive. One possible explanation is the underdevelopment of the financial industries in some NRBC, as discussed in the previous section. To explain this phenomenon with rigorous evidence, however, entails research that focuses on this area.

Recent research revisiting the finance-growth nexus using non-linear models demonstrates that the relationship tends to vary among the different income country

groups (Barajas et al., 2013; Samargandi et al., 2015, for instance). Scholars interested in the NRBC, can expand their inquiry into the relationship between the banking sector development and long-term economic growth in those countries by considering each income country group separately. Presenting findings that demonstrate the nature of the relationship for the various income country groups is invaluable for policymakers across the NRBCs.

Further, the implications of the findings for the GCC countries need to be addressed, particularly in relation to the banking sector regulations and economic policy. The banking sector regulations across the region tend to vary from one country to another depending on how established and open the financial industry is in each country. Assessing the regulations in the light of the findings of this thesis can present regulators and policymakers in the GCC countries with the means to enhance the effect of banking sector deepening on long-term economic growth.

In addition, the GCC countries can benefit from understanding whether the development of the banking sector supports the establishment and growth of other industries, and promotes economic diversification. As stated earlier, improving people's living standards and diversifying the economy away from the hydrocarbon sector is at the forefront of the economic policies and strategies across the region. Investigating whether the deepening of the banking sector contributes to economic diversification can assist the GCC countries in setting appropriate economic policies in this regard.

One of the unexplained findings of this thesis is the negative association between the bank liabilities to GDP ratio and the economic growth proxies. In seven out of the ten statistically significant models, the results suggest that higher levels of the banking sector depth measure results in lower long-term economic growth. The findings of the models employing the bank liabilities to GDP ratio contradict those associated with the other models that generally report a positive banking-growth link. This is particularly evident in the case of the economies that are not dependent on natural resources, where the coefficient sign in front of the banking sector depth measures in the models is consistently negative.

Further research in this area is required to explain such a relationship between the bank liabilities to GDP ratio and the long-term economic growth indicators. The findings reported here lead us to question if the bank debt structure—whether it is reliant on customer deposits as opposed to interbank funding or short-term deposits,as opposed to long-term finance—influences the banking-growth relationship. Another similar question is related to the potential effect of the bank liabilities' debt and equity composition on the relationship under consideration.

The proposed questions for the next project are *"What are the implications of the finance-growth nexus for the banking sector lending regulations in the GCC countries?"* and *"What is the nature of the relationship between the deepening of the banking sector and the development of different economic sectors?"*

8 Conclusion

The question about the nature of the relationship between financial development and long-term economic growth re-emerged in the literature following the Global Financial Crisis of 2008-2009. The severity of the crisis and its consequences for economies across the globe prompted scholars to re-examine the finance-growth nexus.

Despite the increased interest in this research area, a limited number of papers consider the relationship between banking sector depth and economic growth in the GCC States and the NRBC in general. Understanding the relationship in the context of those countries is important for the development of the finance-growth nexus research field in the light of the natural resource curse literature, which suggests that the NRBC's economic structure influences their economic development. Further, the research is invaluable for policymakers across the NRBC intending to develop their banking sectors in an attempt to diversify their economies and stimulate economic growth.

This thesis investigates the extent to which banking sector depth is associated with long-term economic growth in the NRBC—as a proxy for the GCC States—in comparison

with the rest of the world countries. This is done by considering three relationship dimensions: type, time lag between the cause and effect, and magnitude.

The findings associated with the system GMM estimator for the dynamic panel data models demonstrate that the relationship between banking sector depth and economic growth measures is one that is non-linear for both the NRBC group and the other countries group, and is only positive within certain levels of depth. The results confirm the findings of the literature which are that above or below certain levels of banking sector depth the relationship turns negative. For policymakers, the findings highlight the significance of appreciating at which stage of banking sector development a country stands when deciding on the appropriate levels of resources to dedicate and the suitable regulations to adopt in order to optimise the benefits of the banking sector for economic growth.

The estimators also indicate that the time lag between the change in the banking sector depth and the effect on long-term economic growth is shorter in the NRBC group than in the other countries group. This is while the total effect of the banking sector deepening on economic growth is lower in the NRBC group compared to the countries that are not dependent on natural resources. The findings related to the time lag and the total effect pave the way for further research to explain the differences in the nature of the relationship, particularly in the context of the NRBC and in the light of the natural resource curse literature.

The thesis discusses a number of areas for further research. In particular, it proposes researching the implications of the finance-growth nexus for the regulations of the banking sectors in the GCC States. Further, it recommends considering the nature of the relationship between the banking sector deepening and the development of the other economic sectors. More research is required to assist governments in the GCC region and across the NRBC in taking more informed decisions in relation to the development of the banking sectors. An appropriate level of banking development, along with suitable regulations, can ensure high economic growth benefits and improved living standards for the people of those countries.

Project III

The Status & Determinants of the Optimal Banking Sector Depth for Long-Term Economic Growth in the GCC States

Abstract

The objective of this project is threefold in the sense that it investigates the status of the banking sector depth in the Gulf Cooperation Council States, identifies the factors that influence the levels of the banking sector development in those countries, and provides simulation evidence on the changes in the banking sector depth caused by changes in the respective determinants. To this end, mixed effects and system GMM for dynamic panel data models are employed using a dataset that consists of 214 countries spanning the period from 1961 to 2013. The results suggest that the development of the banking sector is contingent upon a variety of factors that can be traced within the structure of the sector, the macroeconomic environment and the governing, institutional, and legal frameworks. In addition, the benchmarking models indicate that five out of the six Gulf States have underdeveloped banking sectors, whilst the findings of the simulation show that Oman and Saudi Arabia are set to experience further development in their respective sectors, and Bahrain and Kuwait could benefit by maintaining and enhancing their banking sectors status through regulatory policies aimed at improving, inter alia banking sector stability, efficiency, competition as well as the rule of law and political stability.

1 Introduction

People's living standards and quality of life are, to a great extent, determined by the respective levels as well as growth of their real incomes. Devising ways to generate and effectively sustain both higher levels of income and long-term economic growth continues to puzzle policymakers in developed and developing countries. Theories on economic growth suggest that growth is generated through the increased availability of resources for production—including labour and capital—and technical progress via the use of new technologies and innovation. In this context, scarcity of available resources in conjunction with demographical changes and higher costs associated with new technologies are thought to be obstacles to achieving high economic growth rates.

The finance-growth nexus literature contends that the development of the financial sector can stimulate economic growth by overcoming market frictions. High transaction costs, lack of contract enforcement, and information asymmetry are market issues that lead to the misallocation of resources, which in turn deters long-term economic growth. The financial sector development deals with such imperfections by producing *ex ante* information for potential investments, monitoring investments and exerting corporate governance after providing finance, diversifying and managing risk, pooling and mobilising savings, and easing the exchange of goods and services (Levine, 2005).

Despite the abundance of empirical evidence supporting the instrumental role that the financial sector plays in stimulating growth, the intensity of the after-effects of the Global Financial Crisis that erupted in 2008-2009 on global economic growth prompted many scholars to revisit and reassess the relationship between financial development and economic growth. More specifically, it emerged that countries with highly developed banking sectors, where the extended credit to the private sector exceeds the size of their GDP—such as Iceland, Ireland, Spain, Portugal, the United Kingdom, and the United States—faced considerable difficulties during the crisis.

The current findings in the literature—including those of Project II of this thesis—suggest that the relationship between banking sector development and long-term economic growth is non-linear where the positive relationship between the two variables turns negative beyond a certain level of banking sector development. Thus, identifying the optimal levels of banking sector development is crucial for many countries striving to maximise the positive contribution of their banking sector to economic growth. This is particularly significant for the GCC countries.

Since the discovery of crude oil in the Gulf States in the early 1930s, the hydrocarbon sector has become an integral part of the economic structure of the region. The revenues from the sale of crude oil and natural gas has provided governments across the region with economic rents that were distributed to its people through direct payouts and the provision of generous public and welfare services. This contributed immensely to the

social and economic development of the Gulf States, hence elevating the region's standards of living to those enjoyed by high-income countries.

The hydrocarbon sector not only dominated the government revenues but also became the largest contributor to economic output and exports of the GCC countries. This is understood to be unsustainable in the long run and exposes the region to a number of economic challenges. Some of the challenges that the GCC countries have to contend with are the wide fluctuations in governmental revenues during periods of increased volatility in the crude oil and natural gas market prices; their economies have become subject to what is known in the economic literature as the Dutch disease and the natural resources curse, where the development of the hydrocarbon sector undermines the development of other industries and the economy experiences lower economic growth rates relative to its peers without natural resources; the natural resources are finite and their prices are not only determined by the increase in global demand but also the availability of alternative sources of energy and advances in technology. In view of the implications that the current structure of the GCC economies might pose on the region, policymakers have placed economic diversification at the forefront of their policies' agenda and national strategies.

Despite the fact that the financial sector in the Gulf region is the third largest contributor to economic output, the banking sector is still considered to be underdeveloped in comparison to other high-income countries. This, however, positions banking as a leading sector to diversify the economic structure of the countries in the region. By developing the banking sector, its direct and indirect contribution to GDP diversification and growth are expected to increase. The direct contribution is associated with the growth in the banking industry, while the indirect is related to the development of other economic sectors that depend on bank financing as a means of achieving long-term growth.

Assessing the status of the banking sectors in the region and identifying factors that allow their development are therefore crucial for the governments across the Gulf. This research effort intends to investigate the levels of banking sector depth and the

determinants of the banking sector development, as well as gain an insight into the effects that changing the levels of the determinants would have on the status of the sector's depth in the Gulf States.

The rest of the project is structured as follows: section 2 provides a literature review of the banking sector development determinants and benchmarking studies, whilst section 3 introduces the data and variables employed for the empirical investigation. Section 4 discusses the hypotheses and methodological framework, followed by section 5 where the empirical results are presented. Section 6 discusses the results and at the same time proposes areas for further research. Section 7 elaborates on the brief but comprehensive simulation exercise and finally section 8 provides some concluding remarks. Figure 9 provides a detailed overview of the research structure.

Figure 9. Research Structure of Project III

2 Literature Review

In the light of recent evidence supporting the view that the development of the financial sector promotes long-term economic growth, scholars' interest in investigating the potential determinants of the financial sector development has grown considerably. The Global Financial Crisis of 2008-2009—which revealed the increased vulnerability to

crises of countries with overdeveloped financial sectors—in conjunction with the recent research findings suggesting that the relationship between banking sector depth and long-term economic growth is non-linear, has also prompted researchers to look into the optimal level of banking sector depth for economic growth through benchmarking. This subsection reviews the literature on the determinants and benchmarking of the banking sector development. The aim is to explore the literature and highlight the areas for further study.

2.1 Determinants of Banking Sector Development

Studies which consider the factors that influence the development of the banking sector assess the significance of the legal systems and origins, institutions, political economy, social capital, policies, and regulations, among others, for the sector development.

2.1.1 Legal Systems & Origins

Beck and Levine (2003) contend that legal institutions explain the differences in the levels of financial development across countries in two ways. Firstly, financial intermediaries and markets grow in countries in which the legal systems enforce private property rights, support private contractual agreements, and protect the investors' legal rights. Secondly, the differences in investors' protection, the contracting environment, and financial development are due to the number of legal traditions that emerged in Europe and were spread internationally through conquest, colonisation, and imitation.

Based on the work of Hayek (1960), Beck and Levine (2003) identify two mechanisms through which the legal origins affect financial development. The first is the "political" mechanism where the variation in the legal traditions, in terms of their preference to private property, as opposed to the right of the State and protection of private contracting rights, set the basis of financial development. The second mechanism is "adaptability" which is related to the formalism and ability of the legal systems to evolve with changing conditions, and the efficient adaptability of the legal traditions that can converge with the contracting needs of the economy and legal system capabilities, encouraging financial development.

La Porta et al. (1997, 1998) show that countries with poorer investor protections have smaller and narrower equity and debt markets. La Porta et al. (1997) illustrate that countries adopting French civil law have weaker investor protections and less developed capital markets in comparison to countries following the common law. One of the empirical models employed by their paper is a cross-sectional OLS model in which a measure of bank credit to private sector and bonds issued by non-financial entities to GNP ratio is regressed on GDP growth, a rule of law index, creditors' rights index, and a dummy variable for the different law origins. Based on the data for 39 counties, the model demonstrates that the countries with French legal origin have lower debt to GNP ratios.

Beck et al. (2003a) assess the validity of the political and adaptability channels and find more evidence supporting the latter. As adaptability variables, the authors employ both a case law dummy variable to capture whether judicial decisions are admitted as a source of law and a legal justification index that gauges whether judgements are based on statutory law or on principles of equity. This is while the variables that are associated with the political channel are the tenure of the Supreme Court judges and the Supreme Court's power over administrative cases. Using the 2SLS regression models, Beck et al. (2003a) find that the legal system adaptability explains cross-country differences in banking sector depth, stock market development, and property rights protection.

2.1.2 Institutions

In relation to the financial sector development determinant studies that consider the legal origins and systems, Djankov et al. (2007) investigate the impact of legal creditor rights and creditor registries on the banking sector depth. Their paper estimates a cross-sectional model using the data for 129 countries in 2003 and shows that better credit rights and the presence of credit registry are associated with a higher credit to private sector to GDP ratio. They also find that improvement in creditor rights or the introduction of a creditor registry is followed by an increase in banking sector depth.

In a paper that examines the relationship between capital account liberalisation, legal and institutional development, and financial development, Chinn and Ito (2006)

highlight the significance of creditor protection for financial development. They measure the creditor protection using the creditor rights index developed by La Porta et al. (1998) which gauges the rights of the secured creditor vis-à-vis the managers and the unsecured creditors in the event of reorganisation and liquidation. Employing the data for 108 countries between 1980 and 2000 in a panel error-correction model, Chinn and Ito (2006) find that the level of creditors' protection is positively associated with the stock market turnover and credit to private sector to GDP.

Acemoglu and Johnson (2005) study the importance of contracting and property rights for long-term economic growth, investment, and financial development. Their paper defines the contracting institutions as the rules and regulations governing contracting between ordinary citizens, and the property rights institutions as the rules and regulations protecting citizens against the power of the government and the elite. Using various indices to capture the contracting and property rights institutions, their OLS and IVs' estimates show that the contracting and property rights institutions' proxies are positively associated with the credit to private sector to GDP ratio.

2.1.3 Political Economy

A number of scholars have also highlighted the relationship between different aspects of political economy on banking sector development. Girma and Shortland argue that more "autocratic regimes representing the interests of narrow but powerful elites appear to delay and obstruct financial development" (2004, p.18). Using panel data for developed and developing countries for the period 1975-2000 in OLS and GMM models, Girma and Shortland (2004) show that the banking sector benefits from political stability and increased democracy. Furthermore, their paper illustrates that the degree of democracy and regime stability influences the speed of financial development.

Herger et al. (2008) contend that capital owners tend to avoid countries in which aggravated risks of property right infringement by the State are present. Trade openness is argued to foster domestic competition, undermining the domestic elites' incentive to appropriate rents by expropriating lenders and investors. In addition, Herger et al. (2008) suggest that institutionalised constraints prevent predatory governance from

encouraging financial transactions by providing a further safeguard. The authors employ OLS and 2SLS to investigate the effect of trade openness and institutionalised constraints on financial development. The results show that predatory institutions are more significant for the development of the banking sector while international economic integration has more influence on stock market development.

Huang (2010b) considers the impact of democratic process for institutional improvement on financial development. The empirical models of Huang regress three measures of banking sector depth on the Polity indicator in the Polity IV database of Marshall and Jaggers (2009) as a measure of institutional improvement and a set of controlling variables. The findings of the least square dummy variable and the system GMM estimator demonstrate that the institutional quality improvement promotes banking sector deepening at least in the short-term, particularly in lower income economies, ethnically divided, and French legal origin countries.

In a related study, Bhattacharyya and Hodler (2010) examine the influence of political institutions on banking sector development in the natural resource-rich countries. Their paper postulates that, in countries with limited natural resources, political leaders benefit from fostering contract enforcement which attracts investments, increases economic output, and subsequently generates more government revenues. In contrast, the elites in economies with abundant natural resources have no incentive to advance contract enforcement in the absence of sound political institutions as they can directly appropriate natural resources.

Bhattacharyya and Hodler (2014) test this hypothesis using panel data for 133 countries between 1970 and 2005. The fixed effects and IV estimators indicate that the relationship between natural resources and banking sector depth depends on the quality of political institutions. Natural resources revenues are found to be negative for banking sector development in countries with poor political institutions but the relationship vanishes as political institutions' quality improves. The latter is approximated using the Polity2 indicator of the Polity IV database, a score which corresponds to the difference between the democracy and autocracy scores.

2.1.4 Geographical Endowment

In evaluating the banking sector development determinants, scholars have considered the effect of the geography and disease environment faced by colonisers on the formation of institutions and subsequently the development of financial sectors of those colonies.

The endowment theory put forward by Acemoglu et al. (2000) contests that Europeans adopted colonisation strategies that varied from those that support property rights and check the power of the State, to others that empower the elites to extract gold, silver, and other resources. The latter is referred to as the "extractive states". They go on to explain that the strategies adopted reflect the colonisers' intention and feasibility to settle. The Europeans particularly created extractive states in colonies that exhibited inhospitable and disease-ridden environments leading to high mortality rates among the settlers. It is suggested that institutions developed by the Europeans persist to the current date. Further, the authors argue that, in countries where the Europeans settled, more democratic and property rights advocated systems are created after independence vis-à-vis the extractive states.

Beck et al. (2003b) evaluate empirically the endowment theory by regressing the credit to private sector to GDP on the mortality rates of the European settlers. The OLS estimator results for 70 former colonies indicate that the initial endowments explain the cross-country variation in the levels of financial intermediary development.

2.1.5 Social Capital & Culture

Looking at the financial contracts from a trust perspective, Guiso et al. (2000) claim that social capital should have a major effect on financial development. Their paper follows Bourdieu's (1985) sociology description of social capital as being the advantages and opportunities that people obtain by being members of certain communities, and the political scientist Putnam's (1993) definition of social capital as "features of social life - networks, norms, and trust - that enable participants to act together more effectively to pursue shared objectives" (Guiso et al., 2000, p.5). Guiso et al. (2000) maintain that financing is nothing but the exchange of money today for a promise to return more

money in the future. The agreement to such a transaction not only depends on the enforceability of the contracts but also the extent to which the lender trusts the borrower. Financial contracts are trust intensive contracts and thus higher levels of trust, it is argued, improve the efficiency of financial contracts.

Guiso et al. (2000) also consider the relationship between social capital and financial development in Italy. The authors employ the electoral turnout at the province level and voluntary blood donations as measures of social capital. Their empirical models illustrate that social capital measures are positively associated with financial development proxies such as the number of bank cheques issued and the level of financial wealth held as bank deposits, among other variables.

Stulz and Williamson (2003) explore whether differences in culture explain the variation in investor protection across countries. In their study, the authors follow Boyd and Richerson's (1985) definition of culture as the "transmission from one generation to the next, via teaching and imitation, of knowledge, values, and other factors that influence behavior" (Stulz & Williamson, 2003, p.314). Stulz and Williamson (2003) consider the relationship between culture, approximated by religion and language, and financial development in their investigation. Their empirical models' results reveal that religion variables explain the differences in levels of long-term debt issues to GDP across countries. The culture variables, however, fail to explain the differences in the ratios of equity issues, private credit, and stock market capitalisation to GDP.

2.1.6 Financial Repression, Regulations & Inflation

The literature also identifies financial repression as a factor that influences the development of the financial sector. McKinnon (1990) describes an economy as financially repressed when the government taxes or distorts their domestic capital markets. In the presence of inflation, interest rate ceilings, high reserve requirements on bank deposits, and mandatory credit allocation reduce the attractiveness of holding claims on the domestic banking system. Bencivenga and Smith (1992) present a theoretical model in which high reserve requirements lead to the development of an informal financial sector that coexists with the formal sector and is not subject to such requirements. The model demonstrates that financial liberalisation results in welfare

gains as funds shift from the informal to the formal sector, which provides superior risk sharing.

Roubini and Sala-i-Martin (1992) contend that some governments tend to repress the financial sector to attain inflationary revenue as financial repression induces private agents to carry larger stocks of nominal money. Their theoretical model indicates that such policies reduce the amount of services provided by the financial sector to the economy. Roubini and Sala-i-Martin (1995) also present a theoretical model which illustrates how, in financially repressed sectors, the direct and indirect government regulations affect the costs of transferring savings to investments.

Empirical research suggests that inflation is inversely related to banking sector development. Boyd et al. (2001) utilise the data of 97 countries for the period between 1960 and 1995 in dynamic panel data models. The GMM estimator findings indicate that low to moderate inflation rates are negatively associated with banking sector depth measures, such as bank credit to the private sector, bank assets, and bank liabilities to GDP ratios.

Barth et al. (2004) investigate the link between specific regulatory practices and banking sector depth, efficiency, and stability. Using a database of 107 countries, these authors provide empirical evidence of a negative relationship between regulations restricting banks from engaging in investment banking, insurance, and real estate activities and the level of banking sector depth. They also find a positive connection between private monitoring—measured by indices related to external auditing, credit rating, and accounting standards—and banking sector depth.

2.1.7 Trade & Capital Account Liberalisation

In the literature, trade openness and capital account liberalisation are argued to be instrumental for the financial sector to thrive. Rajan and Zingales (2003) claim that incumbent firms and financial intermediaries have an interest in maintaining an underdeveloped financial sector. The competition-enhancing effects of financial development, they argue, would jeopardise the economic rents exploited by the

incumbents under the current competition environment. They maintain that trade and capital account liberalisation align the incumbent firms' and financial intermediaries' interest in financial development as the benefits of liberalisation offset the costs associated with the loss in economic rents.

Huang and Temple (2005) study the relationship between trade openness and financial development empirically. They regress three different measures of banking sector depth on trade openness instrumental variables and total trade to GDP ratio using OLS with IVs and GMM estimators. The cross-sectional model results of Huang and Temple (2005) indicate that trade promotes banking sector development in higher-income countries but not in the lower-income countries.

Another paper that lends support to Rajan and Zingales' (2003) theory is that of Baltagi et al. (2009) which finds that both trade and capital account openness are significant determinants of banking sector development. Baltagi et al. (2009) assess the relationship using the data for 74 developed and developing countries in GMM estimators for dynamic panel data models. The paper's results also show that while opening both trade and capital accounts benefits closed economies, opening up one without the other can still be positive for the development of the banking sector in a closed economy.

2.2 Benchmarking Banking Sector Development

Benchmarking banking sector development enables researchers and policymakers to evaluate the level of banking sector development which, in conjunction with the level of economic development and institutional quality, constitutes *inter alia* key factors that influence the demand and supply of financial services. In addition, benchmarking is crucial for assessing the risk of the sector to crises. This subsection reviews the literature pertaining to banking sector development benchmarking and optimal level studies.

2.2.1 Theoretical Studies

One of the first theoretical research papers that consider the optimal level of financial development is that of Beck and de la Torre (2006). Their paper introduces the concept of the access possibility frontier, which was later developed into the broader financial

possibility frontier notion discussed below. They define the access possibility frontier as the maximum equilibrium outreach in terms of access to credit that is prudently achievable given the state variables. The state variables that are thought to influence the supply of loans are: the macroeconomic risk, the quality of the contractual and informational environment, and the ability to diversify idiosyncratic risk. The demand for loans depends on the cost of borrowing and the available investment opportunities.

Beck and de la Torre (2006) show that under three conditions, the level of extended credit in the economy is suboptimal. Under the first condition, the demand for loans is low due to self-exclusion resulting from cultural barriers or financial illiteracy. In the second, the supply of credit is suboptimal due, in the main, to regulatory distortions or lack of competition. The third condition revolves around excessive credit.

In effectively dealing with those suboptimal conditions, Beck and de la Torre (2006) propose three policy responses: a) market-developing policies that aim at raising the sustainable prudent possibility frontier by changing the State variables, b) market-enabling policies, which allow financial institutions to move closer to the frontier by providing incentives or removing obstacles, and c) the market-harnessing policies intended to prevent the financial system from moving to an unsustainable imprudent equilibrium beyond the frontier.

Following the work of Beck et al. (2008) and Čihák et al. (2012) on the dimensions of financial development (i.e. access, depth, efficiency, and stability), Beck et al. (2012) and Beck and Feyen (2013) advance the concept of the access possibility frontier to the financial possibility frontier. The latter is a broader concept that is defined as "the maximum *sustainable* depth (e.g., credit or deposit volumes), outreach (e.g., share of population reached) or breadth of a financial system (e.g., diversity of domestic sources of long-term finance) that can be realistically achieved at a given point in time" (Beck et al., 2012, p.42, italics in the original). The State variables that influence the financial possibility frontier are structural variables (such as income, savings, and population density), macroeconomic management and credibility, legal and informational

frameworks, prudential oversight, technology and infrastructure availability, and socio-economic factors.

Beck and Feyen (2013) illustrate that the financial possibility frontier can be operationalized using a benchmarking exercise developed by Beck et al. (2008) and de la Torre et al. (2011). The benchmarking, however, is not equivalent to the frontier as it fails to consider the long-term institutional characteristics of countries, according to Beck and Feyen (2013). The benchmark rather represents the level of financial development predicted by the structural country characteristics. The latter is referred to as the structural depth line.

2.2.2 Empirical Studies

An empirical study that considers the "optimum level of financial activity" in economies, given the general level of development, is that of Graff and Karmann (2006). As the benefits of financial development for economic growth depend on the economic and institutional environment, their paper argues that poor countries might be caught in a poverty trap where high transaction costs, and the lack of physical and human capital, hinder the development of the financial sector and its contribution to economic growth.

Graff and Karmann (2006) employ data from 90 countries spanning the period from 1950 to 2000 to regress the share of the labour force employed by the financial sector, the financial system contribution to GDP, and money supply to GDP ratio—as financial development proxies—on the income per capita and the squared value of income per capita. They use this approach to measure the degree of financial imbalance (i.e. over- and under-development of the financial system) for the sample. The financial imbalances are split into high and low score groups and are used to explain the variation in the income per capita in another regression.

The findings of Graff and Karmann (2006) demonstrate that countries benefit less from financial development when that development fails to keep up with, or exceeds, what

would follow from a well-balanced expansion path, given its overall state of development.

Two empirical studies that benchmark financial sector developments using approaches similar to that of the financial possibility frontier are those of de la Torre et al. (2011) and Barajas et al. (2013a). Under the assumption that the development of the financial sector exacerbates market failures and consequently undermines financial stability, de la Torre et al. (2011) explore the financial development in Latin America and the Caribbean (LAC). The paper utilises a two-stage approach to benchmark the financial sectors. First, financial development indicators (including the credit to private sector, bank domestic deposits, and bank non-deposit funding to GDP ratios) are regressed on indicators of contract enforcement, legal rights, credit information property rights, and credit crises, as well as other controlling variables, using a global database for the period 1980-2008 and quantile (median) regression models. Then the cross-sectional estimate over medians is compared to the financial development levels of the LAC region over time. The results show that the banking sector in LAC is considerably underdeveloped, with past financial turbulences explaining most of its underdevelopment.

Barajas et al. (2013a) apply the financial possibility frontier concept to assess the financial performance across countries. The paper utilises the concept via a benchmarking method in which the actual levels of financial development are compared with predicted levels by the structural characteristics. Barajas et al. (2013a) follow Al-Hussainy et al. (2011) by regressing the credit to private sector to GDP ratio, bank deposits to GDP, and stock market turnover on GDP per capita and its squared values, population density, age dependency ratio, and offshore, transition and oil-exporting countries' dummy variables. The difference between the actual level of financial sector depth measures and their values predicted by the latter model are computed for each country. The authors subsequently regress the differences in the credit to private sector to GDP measure on macroeconomic, market structure, regulatory policy, and institutional variables.

By using OLS methodology and data for 150 countries over the period from 1975 to 2005, Barajas et al. (2013a) show that countries with lower inflation rates, higher remittance inflows, and more rapid previous growth rates, tend to outperform other countries by obtaining lower gaps relative to their structural benchmarks. The findings are similar to economies where restrictions on foreign banks are fewer and the share of government owned banks is lower.

2.3 Literature Development

Studies that investigate the determinants of financial sector development have considered different research questions, datasets, and empirical methods over the years. Prior to the seminal work of King and Levine (1993b) that found a strong association between financial development and economic growth, scholars examining the relationship between the financial sector and economic activities focused on the costs and benefits of financial repression for the broader economy. McKinnon (1973) and Shaw (1973) provided two of the core studies in this area that demonstrate how government interventions in the financial sector deter economic growth by shifting the economy away from its competitive market equilibrium. Their studies suggest that imposing interest rate ceilings discourages savings, capital accumulation, and efficient allocation of capital in the economy (Gemech & Struthers, 2003).

Following the growth in the number of research papers investigating the finance-growth nexus, part of the literature shifted its focus towards the role of legal origins and systems on the development of the financial sector, while others considered the role of institutions and political economy. Thus the research interest diverted from understanding the effect of government intervention on financial sector development to the more fundamental institutional setting within the economy on the sector development. Papers examining the relevance of the legal origins and systems employ relatively smaller datasets and simple methods, such as the cross-country OLS and 2SLS models. In contrast, studies assessing the effect of institutions and political economy used datasets that include more than 100 countries and adopted the OLS, IVs, and GMM models. This might be due to the fact that the latter studies are somewhat

more recent than those investigating the legal origins and systems as determinants for financial development.

Furthermore, a number of existing papers in this research area have resorted to exploring the significance of the factors associated with government policies on the sector development. In general, empirical research considering economic liberalisation, inflation, and banking regulations continues to use advanced panel data models adopted by earlier studies on the determinants of banking sector development.

The research undertaken in the area of banking sector development benchmarking can be thought of as an extension of the long-standing inquiry into the finance-growth nexus. Prior to the Global Financial Crisis of 2008-2009, there was a general consensus among scholars that the development of the banking sector is always positive for economic growth. Accordingly, researchers during that period focused on trying to identify the potential level of banking sector development in countries with underdeveloped banking sectors. The devastating effects of the crisis on economic growth and stability, however, prompted many to reassess the relationship between financial development and economic growth. The findings suggest that the finance-growth nexus is non-linear, hence suggesting that beyond a certain level of banking sector depth, the relationship turns negative (Arcand et al., 2012; Barajas et al., 2013a, for instance). Following those findings, scholars investigated the optimal level of banking sector depth level for long-term economic growth. In this context, the aforementioned empirical papers in this area use large datasets with various financial development proxies whilst Barajas et al. (2013a) employ simple cross-country OLS models.

2.4 Areas for Further Research

Banking sector development literature generally concentrates on macroeconomic factors. One possible explanation is the lack of microeconomic data for many countries. As more data become available, researchers can assess the significance of the different banking sector structures on their development. Elements such as the type, size and international presence of individual banks can be considered.

Another potential topic for further investigation is the effect of the increased use of technology in banking. Over the years, many banking services have become available through the Internet and mobile banking channels. Investigating the effect of those channels on the overall development of the sector would be valuable, particularly for countries with underdeveloped physical banking infrastructures. Such studies could help policymakers and bankers in those countries to estimate the value of investing in technology vis-à-vis physical bank branches.

Scholars can also consider the influence of the economic structure on the development of the banking sector. Different economic sectors have different levels of dependency on bank finance for their operations. A capital-intensive industry is expected to rely more on debt to finance its long-term capital investment projects, as opposed to a service sector using debt to fund its short-term working capital. Identifying unilateral or bilateral relationships between the development of certain economic sectors and the development of the banking sector would provide us with a better understanding of the synergies between the banking sector and other parts of the economy.

Research into the field of banking sector development and optimality is novel, hence making the prospects for further studies promising. The few empirical papers that benchmark the development of the sector for different countries focus solely on the depth element. Further investigations are likely to consider the banking sector development benchmarking in terms of access, efficiency, and stability.

In addition, current empirical studies benchmark the banking sector depth in countries using their structural characteristics. The question of the optimal level of banking sector development required to achieve the highest level of sustainable long-term economic growth remains to be answered by future studies. To do so, scholars need to identify and adopt different models going forward. Answering the optimality question is vital for policymakers intending to maximise the positive effect of their banking industries, for regulators contemplating the ceiling on banking activities that aim to mitigate their risk to crises, and for scholars interested in understanding the finance-growth nexus.

3 Data & Variables

This section introduces and discusses the variables employed in the models presented in this thesis. The first two subsections discuss the variables used in estimating the finance-growth nexus mixed effect models and the banking sector development determinant system GMM models in terms of their source, definition, selection rationale, and relation to the literature. The third subsection provides descriptive statistics of selected variables for the individual GCC countries and the average for the region in comparison to the average of the other countries in the top GDP per capita quartile.

3.1 Variables Associated with Finance-Growth Nexus Models

As discussed in the Hypotheses and Methodological Framework section below, the relationship between banking sector depth and economic growth is estimated using the mixed effects method. On the basis of this method, the models are specified to explain the variation in the economic growth proxies using the banking sector depth ratios and a set of controlling variables.

The dependent variables include real GDP per capita, real GNI per capita, gross capital formation to GDP ratio, and private sector gross capital formation to GDP ratio (the last two hereafter referred to as the investment to GDP and private sector investment to GDP ratios respectively). The variables are selected as proxies for economic growth. The source of all the dependent variables is the World Development Indicators database of the World Bank, which consists of 214 countries for the period from 1961 to 2013.

As proxies for the measures of banking sector depth, the credit to private sector to GDP, bank assets to GDP, bank liabilities to GDP, money and quasi money to GDP, and liquid liabilities to GDP ratios (hereafter the last two indicators are referred to as money supply to GDP and broad money supply to GDP ratios accordingly), are used. Finally, the controlling variables set consists of the initial level of economic growth measures, rate of inflation, government consumption, level of education, trade openness, and

foreign investment. All the independent variables, with the exception of the bank assets to GDP and the bank liabilities to GDP ratios, are obtained from the World Development Indicators database. The source of the two banking sector depth measures is the Passport database of Euromonitor International, which covers 170 countries for the period between 1977 and 2013.

The variables used to estimate the finance-growth relationship with the mixed effect method are identical to those employed in estimating the system GMM estimator in Project II. For the discussion of the variables definitions, selection rationale, and relation to the literature, please refer to Project II and Tables A.3 to A.5 in the Appendix.

3.2 Measures Employed in the Banking Sector Depth Determinant Models

The variables associated with the banking sector depth determinant models can be divided into four groups. The first consists of the banking sector depth variables presented in the previous subsection and these are included in the models as the dependent variables. The second group of measures is the banking efficiency, stability, and competition group, which includes variables associated with other banking sector development dimensions and the banking market structure. The third category is the macroeconomic and demography, while the fourth is the governance, institutional and legal framework.

3.2.1 Banking Sector Depth Ratios

The first variable in the banking sector depth group is the credit to private sector to GDP ratio. This ratio is the most employed in the financial sector development determinant and benchmarking literature (Baltagi et al., 2009; Barth et al., 2004; Beck & Feyen, 2013; Boyd et al., 1996, to name a few). Despite its wide use, the variable is narrow in the sense that it only considers the credit extended to the private sector, neglecting lending to the public sector.

The second and third measures of banking sector depth are the bank assets to GDP and bank liabilities to GDP ratios. Both ratios are broader than the credit to private sector to GDP ratio as they capture the banking activities relative to the size of the economy,

with one focusing on the lending and investment activities of the banks while the other takes into account the role of banks in attracting deposits and other funds for their operations. Research in the literature employing the bank assets to GDP ratio include *inter alia* Beck et al. (2008), Bhattacharyya & Hodler (2014), and Boyd et al. (2001) whereas studies utilising the bank liabilities to GDP ratios include Beck et al. (2003b), Boyd et al. (1996), and Huang (2010b). A number of the aforementioned studies indicate that the ratios are used as an alternative proxy to the credit to private sector to GDP ratio.

The last dependent variable is the money supply to GDP ratio. The variable denotes the currency outside banks and all non-government related deposits at banks relative to the size of the economy. The money supply to GDP ratio is considered to be a broad measure of banking sector depth and is employed in the literature by Bhattacharyya and Hodler (2010) and Graff and Karmann (2006).

3.2.2 Banking Stability, Efficiency & Competition Measures

Bank stability, efficiency and competition indicators form the first group of explanatory variables. The rationale behind including this group is to assess the effect of the levels of those banking sector measures on the sector depth. The source for all the independent variables in this category, as well as the macroeconomic and demography group, is the World Development Indicators database of the World Bank.

The stability measures included here are the z-score and the credit to bank deposits ratio. The z-score measures the buffer of a countries' banking sector relative to the volatility of its returns. It is aimed at calculating the commercial banking system's probability of default. In the literature, de la Torre et al. (2011) use the banks' capital adequacy as a banking sector stability variable to explain the variation in the banking sector depth levels among the LAC countries. The bank z-score takes into account the capitalisation of the banking sector when the buffer is calculated and relates it to the volatility in the sector returns; as such, it is a more advanced measure of stability. The credit to bank deposits ratio is defined as the resources provided to the private sector by the banks relative to their deposits. In contrast to the z-score, the credit to bank deposits

ratio variable captures the level of the banking sector stability from a liquidity perspective. The liquidity measure, however, is not employed in the literature.

Čihák et al. (2012) assess the banking sector efficiency by measuring the cost of intermediating credit. The two market efficiency variables considered here are the bank's interest rate margin and cost to income ratio. The bank's net interest margin is the percentage of net interest revenues to interest-bearing assets while bank costs to income ratio is the share of operating expenses to the operating and net interest income. The lower those two measures, the more efficient the banking sector is considered to be. The bank net interest margin is used by de la Torre et al. (2011) as a determinant of banking sector development. No other study in the banking sector development determinant literature to researcher's knowledge considers the cost to income ratio as an explanatory variable.

Finally, the thesis captures the banking sector competition using the bank concentration and the 5-bank asset concentration measures. The measures are defined as the assets of the largest three and five commercial banking assets respectively. In the literature, Barajas et al. (2013a) include the 5-bank asset concentration along with the Lerner Index of market power as market structure indicators to explain the gap between the actual level of banking sector development and the predicted level associated with their benchmarking model. In general, however, few studies consider bank stability and competition as determinants of the sector development.

3.2.3 Macroeconomic & Demography Variables

The second set of explanatory variables are those related to macroeconomic and demography. The GDP per capita is one of the extensively used measures in explaining the level of banking sector development in the literature. This reflects the wide convention among scholars that the levels of an individual's output and income are instrumental for establishing the sophistication of the financial sector.

Studies in this area, however, overlook the structure of the economy that contributes to the development of the banking sector. Here the ratios of manufacturing value added,

industry value added, and services value added to GDP are used to evaluate whether economies that are more dependent on services, vis-à-vis manufacturing, experience different levels of banking sector development. The manufacturing value added and the industry value added to GDP ratios refer to the net output of certain manufacturing sectors to GDP. The difference between the two ratios is that the manufacturing value added to GDP is a narrower ratio as it excludes mining and quarrying, electricity, gas and water supply, and construction. The services value added to GDP refers to the net output of the wholesale and retail trade, transport, and government, financial, professional and personal services to GDP.

Following Beck et al.'s (2012) theoretical model, which contends that savings is one of the structural variables that influence the level of financial deepening, the thesis includes the ratios of gross savings to GDP. The ratio is calculated as the GNI plus transfers minus total consumption as a percentage of GDP. In the same vein, the household final consumption to GDP is also included in the macroeconomic and demography group; here, consumption is considered, as opposed to savings within the economy. The ratio is the market value of all the goods and services purchased by households relative to the size of the economy.

A macroeconomic variable that is suggested by the literature is trade openness. The measure is computed by dividing the sum of exports and imports by the total GDP. According to Huang and Temple (2005), trade openness is positively associated with financial development. Other papers that utilise the measure include Baltagi et al. (2009), Chinn and Ito (2006), Girma and Shortland (2004), Herger et al. (2008) and Huang (2010a, 2010b).

In the literature, scholars also extensively employ the measures of inflation. Boyd et al. (2001) state that inflation interferes with the financial sector ability to allocate resources effectively. Their research finds a significant negative relationship between the rate of inflation and banking sector development. In this thesis, the consumer price index (CPI) is used as a measure of the inflation rate.

The final variable in the macroeconomic and demography group is total population; this is defined as the number of all residents regardless of their legal status or citizenship with the exception of refugees who are not permanently settled in the country of asylum. Studies that incorporate the total population as an explanatory variable in their banking sector depth determinant and benchmarking models include Beck and Feyen (2013), Beck et al. (2012, 2008), Herger et al. (2008), and Huang (2010a). Beck and Feyen (2013) use the population as a proxy for market size.

3.2.4 Governance, Institutional & Legal Indicators

The final explanatory variables group is the governance, institutional, and legal category. All the variables in this group are taken from the Worldwide Governance Indicators database of the World Bank with the exception of the British legal origin dummy variable which comes from the Global Development Network Growth database of the World Bank. The voice and accountability is the first indicator in this group and it captures the perception of the extent to which a country's citizens are able to participate in choosing their government, as well as their freedom of expression, freedom of association, and freedom of the media. As discussed earlier in the literature review section, a number of studies include measures of democracy to explain the variation in the level of banking sector depth. The voice and accountability indicator is considered to be a broader measure as it takes into account other forms of freedom. Huang (2010b) finds that a free and just society is important for the development of the financial sector.

An additional variable that is deemed significant for the development of the financial sector is political stability. For instance, Boyd et al. (1996, 2001) include the number of revolutions and coups in their independent variables when assessing the factors influencing the sector development, Girma and Shortland (2004) adopt a measure of political regime stability in their banking sector determinant model, and Barajas et al. (2013a) use political risk variables in their study of banking sector depth benchmarking. Accordingly, this thesis includes a political stability and absence of violence indicator, which gauges the perception of the likelihood of political instability and/or politically motivated violence, including terrorism.

Following the findings of La Porta et al. (1997, 1998), measures that capture the legal origins and law enforcement became standard explanatory variables in the banking sector development determinant empirical models. A dummy variable for the common laws' legal origins is utilised in this research to control for the presence of common laws on the banking sector depth. Other studies that control for the legal origins include Acemoglu and Johnson (2005), Beck et al. (2003a), Djankov et al. (2007), and Huang and Temple (2005) to mention but a few.

In addition, a proxy for the rule of law is included as a regressor in this research. It captures the perceptions of the degree to which individuals have confidence in and abide by the rules of society, and particularly the quality of contract enforcement, property rights, the police, the courts, as well as the likelihood of crime and violence. In the literature, Guiso et al. (2000) and Chinn and Ito (2006) use the rule of law index provided by the International Country Risk Guide database, Beck et al. (2003b) include contract enforcement days and creditors' rights indicators, and Beck and Feyen (2013) use enforcement costs and strength of investor protection variables.

Another factor that is found to be meaningful for the development of the financial sector is the level of corruption in the economy. In the models estimated here, a measure of corruption control, which assesses the perception of the extent to which public power is exercised for private gains, is employed. Scholars such as Chinn and Ito (2006) and Barajas et al. (2013a) use measures of corruption in their empirical models.

The last two variables in this group are government effectiveness and regulatory quality. The former gauges the perception of the quality and independence of services and policy, while the latter captures the perception of the government ability to formulate and implement sound policies and regulations that permit and promote private sector development. Huang (2010a) adopts both variables in his investigation of the banking sector development determinants.

3.3 Statistical Analysis

This subsection briefly provides an overview of the data employed in this research and compares the 2011 average data for the GCC's States with means of the high-income countries and all world countries. Table 49 reports the descriptive statistics for each variable.

Table 49: Descriptive Statistics

Variable	No. of Observations	Mean	Minimum	Maximum
Banking Sector Depth Ratios				
Bank Credit to Private Sector to GDP Ratio (%)	7,035	22.74	0.15	311.06
Bank Assets to GDP Ratio (%)	5,034	6.18	0.00	3,037.96
Bank Liabilities To GDP Ratio (%)	4,869	5.27	0.00	2,635.61
Money Supply to GDP Ratio (%)	6,762	35.40	0.02	7,414.26
Broad Money Supply to GDP Ratio (%)	2,500	36.09	3.84	240.56
Economic Growth Ratios & Proxies				
Real GDP per Capita (in USD)	7,803	2,675	50	158,803
Real GNI per Capita (in USD)	4,737	2,463	36	126,599
Private Investment to GDP Ratio (%)	2,928	12.42	0.05	125.21
Total Investment to GDP Ratio (%)	6,628	20.60	0.29	219.07
Banking Stability, Efficiency & Competition Measures				
Z-Score	2,215	11.85	0.05	65.28
Credit to Deposit Ratio (%)	7,345	85.04	1.14	898.05
Net Interest Margin (%)	2,260	3.85	0.01	39.24
Cost to Income Ratio (%)	2,455	54.18	1.53	226.32
Bank Concentration Ratio (%)	2,045	68.81	21.40	100.00
5-Bank Asset Concentration Ratio (%)	1,679	79.22	28.05	100.00
Macroeconomic & Demography Variables				
Manufacturing Value-Added to GDP Ratio (%)	5,709	11.53	0.10	45.97
Industry Value-Added to GDP Ratio (%)	6,179	25.85	1.88	90.51
Services Value-Added to GDP Ratio (%)	6,229	48.82	3.64	100.00
Saving to GDP Ratio (%)	4,852	18.16	0.03	342.15
Consumption to GDP Ratio (%)	6,928	64.58	5.14	271.48
Trade to GDP Ratio (%)	7,440	63.01	0.31	531.74
Consumer Price Index (%)	6,381	12.10	-18.11	23,773.11
Total Population	10,493	3,178,500	6,104	1,600,000,854
Governance, Institutional & Legal Indicators				
Voice & Accountability	3,104	-0.04	-2.30	1.80
Political Stability & Absence of Violence	3,042	-0.07	-3.30	1.70
Rule of Law	3,101	-0.05	-2.70	2.00
Control of Corruption	3,031	-0.03	-2.10	2.60
Government Effectiveness	3,029	-0.03	-2.50	2.40
Regulatory Quality	3,031	-0.04	-2.70	2.20
English Law Dummy Variable	9,048	0.34	0.00	1.00

Figure 10 sets out the banking sector depth ratios on the basis of which it can be observed that the mean depth ratios for the GCC region are more pronounced compared to the respective ratios of the world country groups but less pronounced vis-à-vis those pertaining to the high-income countries.

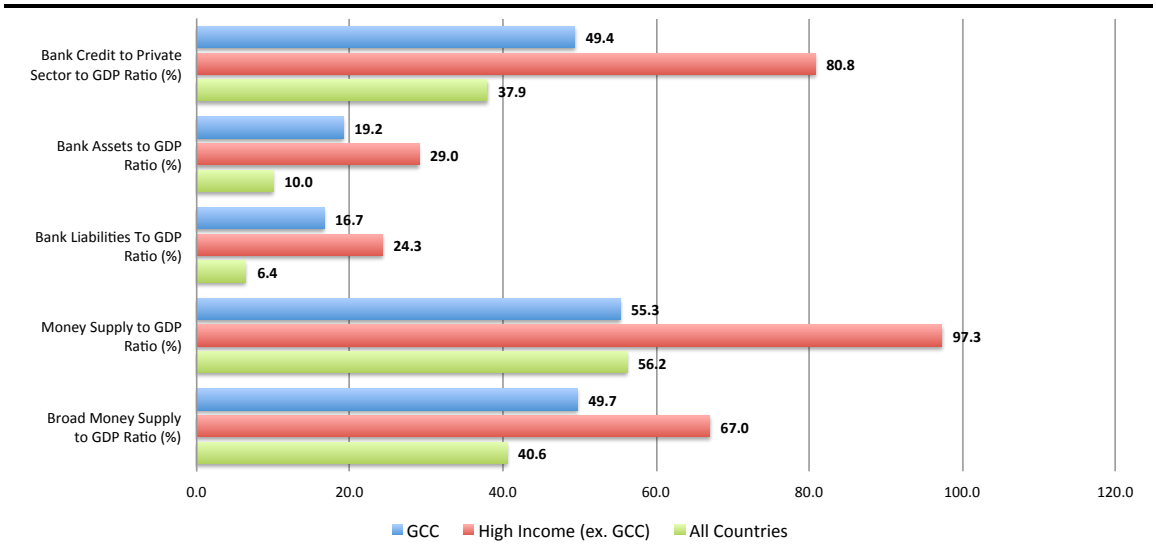

Figure 10. Banking Sector Depth Ratios

As far as the banking sector stability and efficiency ratios are concerned, Figure 11 provides a rather mixed picture when comparing the three country groups. In particular, both the z-score and the credit to deposit ratios are the highest in the GCC group followed by the other high-income countries group. This suggests that despite the greater level of leverage taken by banks in the GCC region in relation to their deposit base, the banks enjoy higher levels of capital and/or lower income volatility.

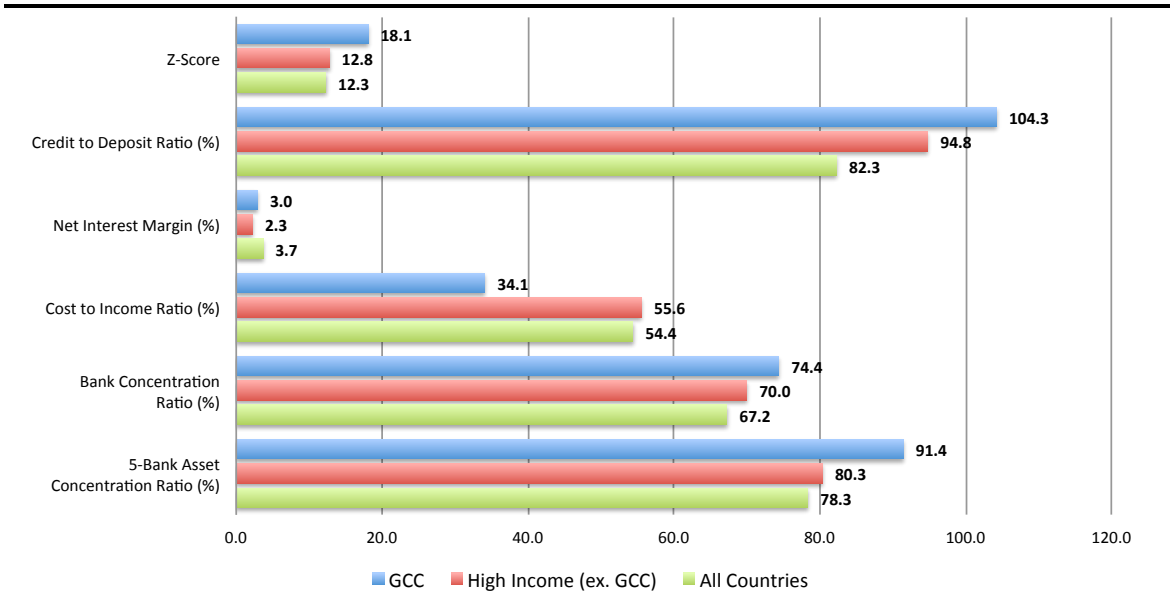

Figure 11. Banking Stability, Efficiency & Competition Measures

In terms of bank efficiency measures, the mean net interest margin of banks in the region is found to be between those of banks in higher-income and all the world countries. This suggests that the banking sector is less efficient than its peers in the other high-income countries in 2011. The banking sector in the Gulf region is the most efficient, however, in terms of cost to income ratio. Finally, the two proxies for competition indicate that the GCC's banking sectors vis-à-vis the other two country groups appear to be less competitive.

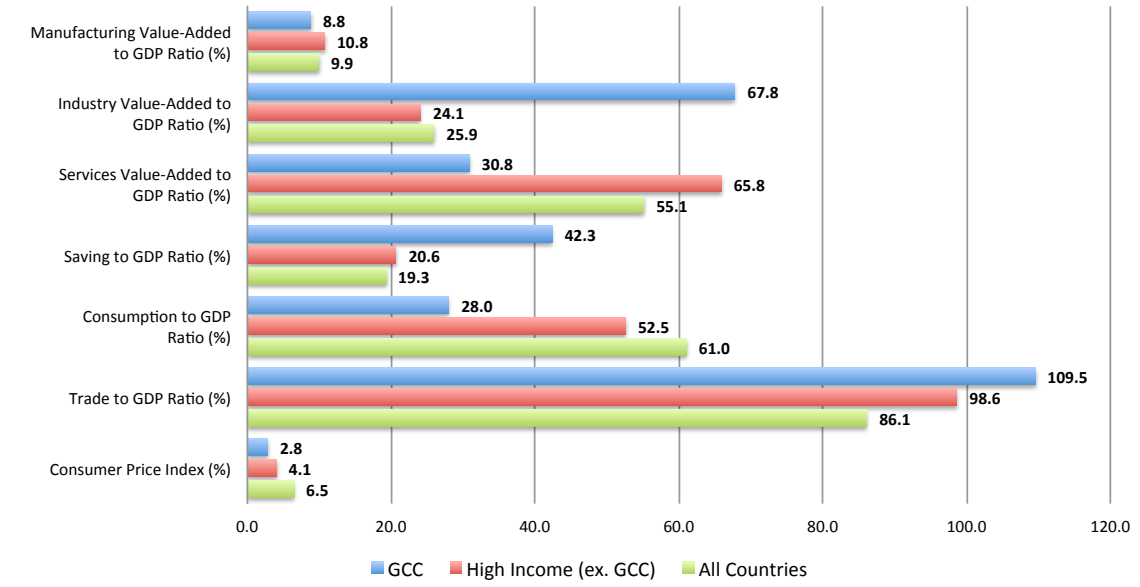

Figure 12. Macroeconomic Variables

An inspection of some macroeconomic indicators, as set out in Figure 12, suggests that the industry value added to GDP ratio dominates the economy in the GCC region whilst the services value added to GDP ratio is relatively less pronounced compared to the other country groups in the year 2011. The level of savings to GDP ratio appears to be higher in the GCC whilst the level of consumption to GDP ratio is lower than the respective levels in both the high-income country group and the world countries group. For the same year, the average trade to GDP ratio registers as the highest in the GCC region whilst the inflation rate as reflected by the CPI was the lowest amongst the three country groups.

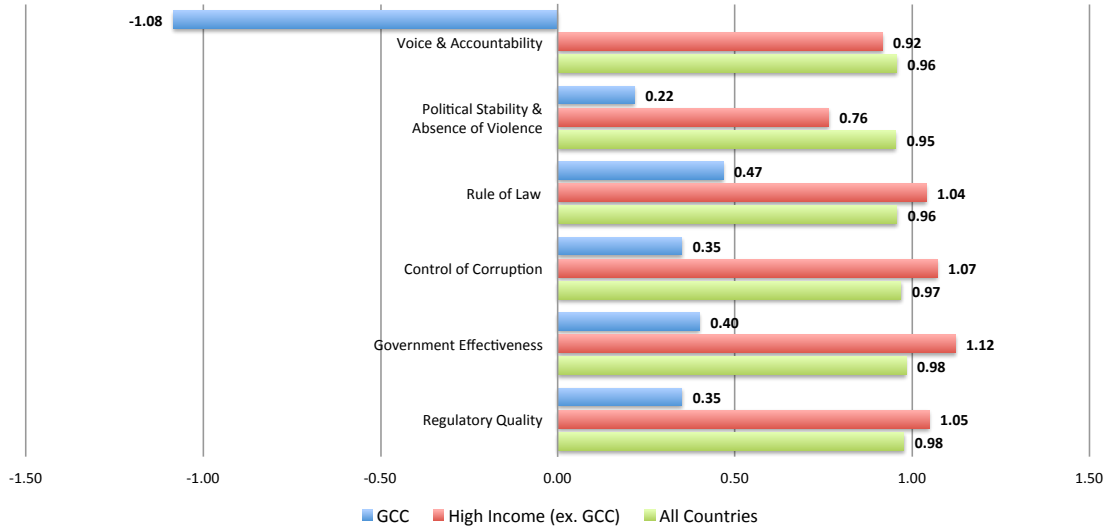

Figure 13. Governance, Institutional & Legal Indicators

A close inspection of Figure 13 which sets out governance, institutional and legal indicators, indicates that the high-income countries exhibit on average the highest levels of governance, institutional, and legal indicators. In contrast, the GCC countries score rather poorly in all categories.

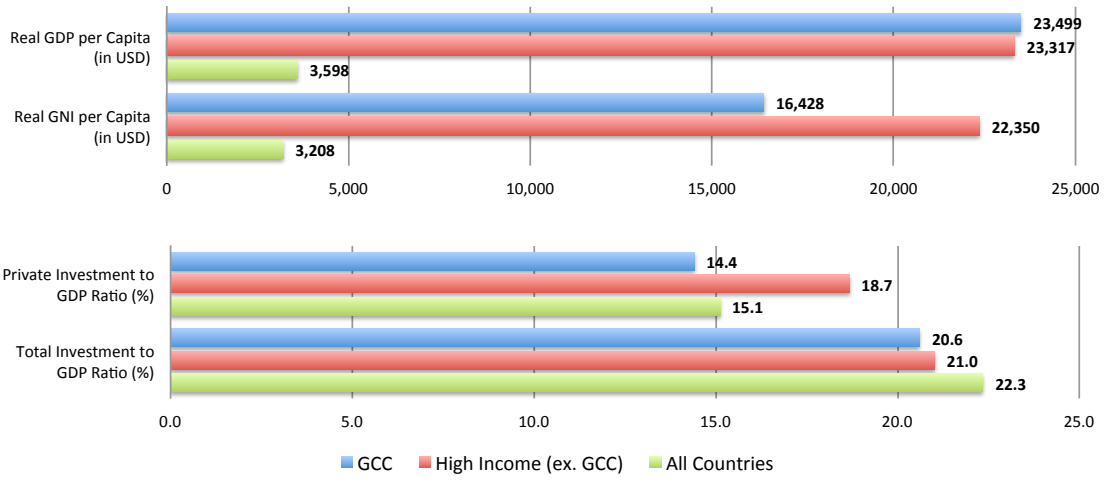

Figure 14. Economic Growth Measures & Proxies

Finally, when considering the economic growth measures, the real per capita income in the Gulf States is higher than the world average and closer to the high-income country

group to which they belong. The other growth proxies show that the size of investments relative to the size of the economy is lowest in the region.

4 Hypotheses and Methodological Framework

This section discusses the research hypotheses and introduces the research methods and process employed. In the first subsection, the research hypotheses are considered in relation to the questions put forward by this study. The second and the third subsections present the mixed effects and the GMM estimation methods respectively, and underline the rationale behind choosing each method. This is followed by an explicit presentation of the econometric specification of the models involved in the estimation. Finally, the study's rigour is assessed by considering the validity, reliability, and generalisability of the research methods, process, and results.

4.1 Statement of Hypotheses

As the objective of this study is to assess the level of banking sector depth in the GCC States relative to countries in which the banking sector depth has the highest positive influence on long-term economic growth, the status of banking sector depth is compared among the six countries and the determinants of banking sector depth are highlighted. Based on the results for the GCC States, policy recommendations, in relation to the convergence of the levels of banking sector depth in the GCC economies with those countries where the banking sector is highly efficient in promoting economic growth, are provided.

It is in this sense that this piece of work attempts to address the following three research questions:

Q1. What are the banking, macroeconomic, and governance factors that influence the banking sector depth in countries with the strongest banking-growth relationship?

Q2. What is the status of the banking sector development in the GCC countries when the banking sector depth determinant models for countries with the strongest banking-growth relationship are employed as a benchmark?

Q3. What are the policies required to converge the banking sector depth levels of the GCC States with those of countries with the strongest banking-growth relationship?

To answer the research questions, empirical models are estimated (as discussed below) to test the following hypotheses:

H1. Banking sector, macroeconomic, and governance factors influence the level of banking sector depth in countries in which banking sector depth is positively associated with long-term economic growth,

H2. The banking sectors in the GCC States are less developed than what is projected by the banking sector depth determinant models for the countries with the strongest banking-growth relationship, and

H3. The introduction of policies associated with the banking sector, macroeconomic, and governance in the GCC States is required to converge the levels of banking sector depth in the six States with those of countries in which the banking sector depth's positive influence on long-term economic growth is the highest.

For the empirical investigation the mixed effects and the GMM estimation methodologies have been adopted. A succinct overview of the strengths and weaknesses associated with these methodologies is also provided.

4.2 Mixed Effects Method

According to Hamilton (2012), mixed effects modelling is a regression analysis that allows for fixed effects, where the intercepts and slopes describe the whole population, as well as random effects, where the intercepts and slopes vary across the sample subgroups.

In the mixed effects model, the relationship between the response and the explanatory variables is given by the following regression equation:

$$E(y_i|\,\alpha_i) = Z_i\alpha_i + X_i\beta \tag{24}$$

where $X_i\beta$ comprises the fixed effects, while $Z_i\alpha_i$ comprises the random effects. The model allows for serial correlation and heteroskedasticity by assuming $Var\ (y_i|\ \alpha_i) = R_i$ and responses between subjects are independent. Further, the mixed effects model assumes that the subject-specific effects (α_i) are independent with mean $E\ \alpha_i = 0$ and variance-covariance matrix $Var\ \alpha_i = D$, a $q \times q$ positive definite matrix. Finally, any non-zero mean for a random effect is incorporated as part of the fixed effects terms following the assumption that the random effects are mean zero (Frees, 2004).

The mixed effects model can be estimated using a number of methods, including ANOVA, the minimum norm quadratic unbiased estimation (MINQUE), the maximum likelihood, and the restricted maximum likelihood. The last two estimation methods are the most applied in the literature. The maximum likelihood estimates are based on the standard application of the likelihood theory, given the model's distribution assumption. In the restricted maximum likelihood estimators, the aim is to form a set of linear contrasts of the responses that do not depend on the fixed effects but on the variance component to be estimated. Subsequently, the maximum likelihood method is applied using the linear contrasts distribution to form the likelihood (StataCorp, 2013a). The regression coefficient can be tested using the *t*-test or Wald tests, while the likelihood ratio or the chi-square tests are performed to test the parameters defining the structure of the random part (Snijders, 2003).

Based on the maximum likelihood or the restricted maximum likelihood estimation of the fixed effects model, the slope coefficient for each individual in the model can be estimated using the iterative technique of Bates and Pinheiro (1998). The technique obtains the best linear unbiased predictions (BLUPs) of the random effects as follows. In matrix notation, a mixed effects model is given by:

$$y = X\beta + Zu + \epsilon \tag{25}$$

where y is the $n \times 1$ vector of responses, X is an $n \times p$ covariate matrix for the fixed effects β, Z is the $n \times p$ covariate matrix for the random effects u, and ϵ is the $n \times 1$ vector of errors that is assumed to be multivariate normal with mean 0 and variance

matrix $\sigma_\epsilon^2 R$. The fixed effects part of the above equation ($X\beta$) is equivalent to the linear predictor from an OLS regression model in which β is the regression coefficient to be estimated. In the random effect part ($Zu + \epsilon$), u is assumed to have a variance-covariance G and is orthogonal to ϵ such that:

$$Var \begin{bmatrix} u \\ \epsilon \end{bmatrix} = \begin{bmatrix} G & 0 \\ 0 & \sigma_\epsilon^2 R \end{bmatrix} \tag{26}$$

Bates and Pinheiro's technique derives the BLUPs of the random effect u using the following equation:

$$\tilde{u} = \tilde{G} Z' \tilde{V}^{-1} (y - X\hat{\beta}) \tag{27}$$

where $\tilde{G}$ and $\tilde{V}$ are the G and $V = ZGZ' + \sigma_\epsilon^2 R$ employing the variance components estimates of the maximum likelihood or the restricted maximum likelihood estimator (StataCorp, 2013a).

The mixed effects method is selected in this thesis to provide predictions of the slope coefficients for the individual countries. As discussed below in more detail in the research process subsection, the predictions are required to facilitate the ranking of countries by the level of banking sector depth influence on long-term economic growth.[29] Other methods that can provide such estimates include the standard OLS, the fixed effects, and the random effects models. The standard OLS approach entails estimating the regression model for each country separately. Accordingly, for each banking sector depth and economic growth measures combination, up to 184 regression models need to be estimated. Further, the model cannot incorporate the controlling variables when estimated using the OLS method due to the small number of observations available for each country. In the case of the fixed effects and random

[29] The intention behind estimating the mixed effect models is to obtain projections of the effect of the banking sector depth on long-term economic growth for the individual countries. The mixed effects models are not employed with the purpose of obtaining the banking-growth relationship at the group level as in the case of the system GMM estimators used in project II.

effects methods, the country-specific slope can be estimated by including an interaction variable between the banking sector depth measure and a dummy variable for each country. Thus 184 interaction variables are required to be included in each model, which result in a considerable loss in the model's degrees of freedom.

The mixed effects method enables the thesis to answer the research questions by providing the predicted slope coefficient associated with the banking sector depth measure in the economic growth equation for each country. All three research questions require identifying the countries in which the effect of the banking sector depth on long-term economic growth is the highest. By using models with different banking-growth relationship measures' combinations, the mixed effects method can underline the countries with the highest banking sector depth slope coefficients. The study subsequently ranks and groups those countries, as discussed in the research process subsection, to answer the research questions.

The mixed effects method has its strengths and weaknesses. According to Wu (2010), the method is often employed by scholars in the literature as it is a natural extension of the corresponding cross-sectional regression model, allows for individual-specific inferences, and also due to the conceptually uncomplicated maximum likelihood estimation and attractive asymptotic properties of its estimates. The mixed effects method disadvantages include the distributional assumption, which is computationally demanding and sometimes can be restrictive.

4.3 Generalised Method of Moments

This subsection discusses the rationale for selecting the system GMM method for dynamic panel data models, the means by which the method answers the research questions, and the strengths and weaknesses associated with the method. An overview of the system GMM method is provided under the Hypotheses and Methodological Framework section in Project II.

In the dynamic panel data models, one or more time lagged dependent variables are included as explanatory variables in the regression equation. The dynamic panel data

models are exploited in this work to identify the determinants of the banking sector depth in countries in which the banking sector positively influences long-term economic growth the most. The relationship between the banking sector depth measures and their previous values necessitates the use of dynamic panel data models. The current level of total bank assets to GDP ratio, for instance, is not only determined by the activities linked to the current periods but also the previous periods over which the assets were accumulated by the banking system. Further, shocks to the banking sector tend to take more than one period to have their full effect. An example is the Global Financial Crisis of 2008-2009 where the deleveraging of the banking system took several years.

The system GMM estimator is selected in this study to overcome issues related to the dynamic panel data models. Arellano and Bond (1991) argue that the presence of the lagged dependent variables among the regressors results in biased and inconsistent OLS estimators because of the correlation between the lagged dependent variable and the individual effect. Despite that within the transformation of the fixed effect panel data eliminates the individual effect, the inclusion of the lagged dependent variable on the right-hand side of the equation makes the fixed effect estimator biased and its consistency depends upon time periods being long. Furthermore, the random effects GLS estimator is biased in a dynamic panel data model. The selection of the system GMM over the first-difference GMM estimator is due to the nature of the panel data employed, where the number of individuals is large while the number of time periods is small. Blundell and Bond (1998) show that the system GMM estimator has considerable efficiency gains over the basic first-difference GMM estimator, particularly in the case of panel data models with short time periods and persistent series. Blundell et al. (2001) use Monte Carlo experiments to demonstrate that the system GMM estimator not only improves precision but also the finite sample bias (Baltagi, 2005).

As in the case of the mixed effects method, the results of the system GMM estimation for the various dynamic panel data models considered in this thesis are crucial in answering all the research questions. Estimating regression equations for the various banking sector depth measures answers the first question by determining the banking sector, macroeconomic, and governance factors that influence the depth of the banking

sector in countries where the banking-growth relationship is most positive. In addition, the estimated regression equations enable the thesis to answer the second and third research questions by providing benchmark relationship equations to assess the banking sector depth status in the GCC States and subsequently put forward policy recommendations.

Despite its advantages over other empirical methods used in estimating the dynamic panel data models, the system GMM estimator is complex. Levine et al. (2000) argue that the system GMM estimator overcomes some of the issues faced by the other dynamic panel data model estimators, such as those related to the unobserved country-specific effects and the joint endogeneity of the explanatory variables. Roodman (2009a) contends that the GMM estimators for the dynamic panel data models are complicated and can result in invalid estimates; however, he also suggests a number of measures to mitigate such risk.

4.4 Econometric Model Specification

In this study, there are two sets of models that have been estimated. The first set includes the models stating the relationship between the banking sector depth and long-term economic growth using different measures' combinations and are estimated with the mixed effects method. The second set of models consists of dynamic panel data models that investigate the determinants of the banking sector depth. The latter models have been estimated using the system GMM estimator. This subsection provides details of the model specifications for each set.

The general regression equation for the first set of models is:

$$y_{i,t} = \alpha_i + \beta_{i,} x_{t-1} + \gamma_i z_{t-1} + \varepsilon_{i,t} \quad (28)$$

where the economic growth measure ($y_{i,t}$) is regressed on a constant (α_i), the first time lagged measure of banking sector depth (x_{t-1}), and the first lagged values of the controlling variables (z_{t-1}). The term $\varepsilon_{i,t}$ is an error term. The equation is designed to capture the relationship between the banking sector depth and economic growth while controlling for the initial levels of income, inflation rate, education, government

consumption, trade openness, and foreign direct investment (FDI). To estimate the random effects for each country, equation number 28 is re-written as:

$$y_{i,t} = \underbrace{\alpha_i + \beta_i x_{t-1} + \gamma_i z_{t-1}}_{\text{Fixed Effects}} + \underbrace{u_{\alpha_i} + u_{\beta_{i,}} + \varepsilon_{i,t}}_{\text{Random Effects}} \quad (29)$$

Equation number 29 is estimated to obtain the BLUPs of the random effects. The BLUPs show the variation in the intercept and the beta coefficient for each country (Torres-Reyna, 2015).

For the second set of models, the general regression equation is given by:

$$y_{i,t} = \alpha_i + \beta_j y_{i,t-1} + \gamma_j x_{i,t-1} + \delta_j z_{i,t} + \varepsilon_t \quad (30)$$

where the banking sector depth measure ($y_{i,t}$) is regressed on a constant (α_i), its first time lagged value ($y_{i,t-1}$), the first time lagged values of the banking sector and macroeconomic factors ($x_{i,t-1}$), and a set of population and governance measures ($z_{i,t}$). The banking sector factors included are the credit to deposit ratio, net interest margin, cost to income ratio, z-score, bank concentration ratio, and top-five banks' concentration ratio, while the macroeconomic factors incorporated are the real GDP per capita, CPI, and the ratios of industry value-added, manufacturing value-added, services value-added, consumption, trade, and savings to GDP. The governance factors consist of the six Worldwide Governance Indicators and an English law dummy variable. Equation number 30 intends to identify the banking sector determinants in a dynamic panel data setting and controlling for population and governance factors.

4.5 Research Process

To conduct the research, certain steps are set for estimating the models, testing their statistical significance, shortlisting the ones that will then be employed in the benchmarking process for the banking sectors of the GCC States, and predicting the levels of the banking sector depth in the six Member States, given the changes to the determinant factors. This subsection introduces the research process by discussing the

research design, highlighting the general to specific approach and its application in the research, and reviewing the statistical tests employed.

Figure 15 provides a summary of the research process adopted in this thesis. In the initial steps, the thesis aims to identify the countries in which the banking sector depth has the highest positive effect on long-term economic growth. To do so, the regression equation number 29 is estimated using the mixed effects method for the different combinations of the five banking sector depth proxies and the four economic growth measures. The models are estimated using data for 184 countries from 1964 to 2013 averaged over ten non-overlapping five-year time periods.

The statistical significance of each model is evaluated by considering the z-statistic probability values associated with the banking sector depth measure coefficients and the likelihood restriction test. The banking sector depth variable is considered statistically significant when the reported z-statistic probability value is below 10%. The set of controlling variables is included in all the models, regardless of their statistical significance, to ensure that various models account for differences among countries owing to such variables. The likelihood ratio test is required to verify whether the mixed effects model offers significant improvement over the linear regression model with the fixed effects only (Hamilton, 2012). A probability value associated with the likelihood ratio test that is below 10% indicates that the mixed effects model provides improvement over the fixed effects model.

After identifying the statistically significant banking-growth nexus models, the predicted slope coefficient for each country is obtained. The predicted slope coefficient variation for each country is derived using the iterative technique of Bates and Pinheiro (1998) and indicates whether the predicted slope coefficients are smaller or larger than the slope coefficient of the whole sample. The slope variation for individual countries along with the sample slope coefficient can be employed to calculate the predicted banking sector depth slope coefficient for each country. The latter informs the thesis about the predicted effect of the banking sector deepening on long-term economic growth in each country.

Figure 15. Research Process

Countries are ranked afterwards based on the significance of their banking sector for economic growth from the highest to the lowest. A list for each statistically significant model is then obtained. Due to the importance of identifying the countries in which the development of the banking sector has the most positive effect on economic growth for answering the research questions, the thesis uses all the lists and follows a simple ranking approach to underline those countries. First, the countries in the top quartile of each list are identified and assigned one point each. The points for each country are then summed and countries are ranked from those with the highest to the lowest points. Finally, based on the average size of all the lists, the top quartile countries in the list with the aggregated points are selected as proxies for the countries with the most influential banking sectors for economic growth.

The data for the countries in the top quartile are subsequently used to estimate the banking sector depth determinant model. The model intends to investigate a number of banking sector, macroeconomic, and governance factors in relation to the banking sector depth in the top quartile countries. Equation number 30 is estimated using the system GMM estimator for the five banking sector depth proxies. To arrive at the models with the statistically relevant explanatory variables, the study adopts the general to specific approach.

The general to specific approach enables the most statistically significant models to be identified by starting with a broad model that includes all the potential determinants of the banking sector depth put forward by the research. The models are then reduced in complexity by eliminating the statistically insignificant explanatory variables while checking the validity of the reductions at each stage to ensure the congruence of the selected model at the end (Campos et al., 2005b). The statistical significance of the explanatory variables is assessed using the t-statistic probability values. At each stage, the regressor with the highest t-statistic probability value is eliminated. In the finally selected model, all the independent variables are significant at the 10% level.

The selected models are also required to satisfy the second order serial correlation and the joint validity of the instruments tests. The second-order serial correlation is a test of the validity of the included lags in the model. The Hansen over-identification test is conducted to establish the joint validity of the instruments in the GMM models (Roodman, 2009a).

The selected banking sector depth determinant models are set as the benchmark models that are utilised in assessing the status of the banking sector depth in the GCC's countries. This is done by inserting the actual figures for each GCC State in the benchmark models to derive the predicted level of banking sector depth, given the country's banking sector, macroeconomic, and governance characteristics. The predicted banking sector depth levels are compared with the actual ones for the country.

Accordingly, the thesis is able to assess the status of the banking sector development for each country.

In addition, the benchmarking process allows the study to compare the level of banking sector development among the GCC's countries. Due to the relatively homogeneous economic structure across the region, the comparison among the GCC States can highlight how the relevant factors contribute to the under- and over-development of the banking sector in each country relative to its peers. Such analysis is expected to hint at policies that can encourage or constrain the development of the banking sectors in those countries.

Finally, this work intends to predict the future levels of banking sector depth for the GCC States, assuming changes in the relevant determinant factors. The study estimates the levels of banking sector depth for each GCC country, assuming that the level of the determinant factors converge to the median level for those top quartile countries over a period of five years. The intention here is to examine the effect of changes in the determinant factors on the expected level of banking sector depth in the GCC States. The predictions can be instrumental in forming policies that target certain levels of banking sector depth across the region.

4.6 Research Validity & Reliability

In this thesis, the research process is designed on the basis of validity and reliability to ensure the study's rigour. This subsection highlights some of the research process aspects—such as the inclusion of the various banking sector depth and economic growth measures, the application of the general to specific approach, the specifications of the estimated models, and the statistical tests—that intend to establish the research validity and reliability. The subsection also briefly discusses the generalisability of the study's findings.

In terms of the research validity, the thesis utilises a number of banking sector depth and economic growth measures when estimating the banking-growth relationship and banking sector depth determinant models. The intention behind selecting different

proxies is to ensure that the two variables are measured using a range of narrow and broad proxies. For instance, the banking sector depth is measured using the narrow measure of credit to private sector to GDP ratio as well as the broad measure of the broad money supply (M3) to GDP ratio.

The research reliability is established by setting a clear research process including the application of the general to specific approach. The thesis presets the research steps for identifying the countries with the strongest positive relationship between banking sector depth and economic growth. The ranking method is limited to statistically significant relationships and is based on a predetermined scoring system. Thus re-estimating the models with the same data and ranking the countries according to the preset scoring scheme and investigation procedure is expected to yield the same results.

Similarly, the general to specific approach adopted in selecting the statistically relevant models of banking sector depth determinants is chosen in order to maintain research objectivity and ensure that the same models are selected when the selection process is repeated. The general to specific approach applied here starts by estimating the broadest models in which all the regressors are included. The coefficient with the highest t-statistic probability value is eliminated from the model and the updated model is estimated. The process is repeated until a model is reached in which all the independent variables are statistically significant at the 10% level. In the absence of such an approach, a subjective selection process might be employed resulting in different selected models.

A number of specifications are taken into account when estimating the banking-growth nexus and banking sector depth determinant models to assert research rigour and provide confidence in the model findings. In the banking-growth relationship models estimated using the mixed effects estimator, the explanatory variables including the controlling variables are considered to be endogenous. As such, the time lagged values of the explanatory variables are used to overcome the issue of simultaneity. In the case of the banking sector depth determinant models, all the regressors are treated as endogenous variables with the exception of the population and governance factors

which are treated as strictly exogenous. The assumption that the latter factors are exogenous reflects the manner by which those factors are influenced and changed. The population size, the selection of the legal system, and the levels of political stability and absence of violence, for instance, are expected to be determined by social, legal, and political aspects within a country but not the banking sector depth levels.

Further, the number of instruments used is taken into account when estimating the banking sector depth determinant models using the system GMM estimators. The use of a large number of instruments weakens the Hansen test of the instruments' joint validity (Roodman, 2009b). The number of instruments included in the model is limited by "collapsing"—whereby instruments are combined through addition into smaller sets—and capping the number of instruments employed at the number of countries in the panel (Roodman, 2006, 2009b). In addition, the banking sector depth determinant models are based on the two-step estimation with the corrected errors coined by Windmeijer (2005). Roodman (2009a) suggests that the two-step standard errors of Windmeijer's correction are quite accurate and their estimation with corrected errors is superior to the one-step estimation. A final model specification considered when estimating the banking sector depth determinant models is the small-sample corrections to the covariance matrix estimate. The latter is adopted due to the relatively small number of countries included in the panel data. As a result, the models are tested using the t-test statistics instead of the z-test statistics for the coefficients and the F-test in place of the Wald χ^2 test for the overall fit.

In terms of the results' generalisability, some of the study's findings are relevant to countries other than the GCC States. The use of the data for all countries available at the ranking stage and the top quartile countries—regardless of their type of economy—when establishing the determinants of the banking sector depth, allow certain aspects of the research findings to be applied to other countries. In particular, the banking sector depth equation can be applied to other nations to determine their banking sector development status and highlight the factors that can influence this status. Furthermore, the research process can be extended to studies beyond the investigation of the banking sector depth in the GCC States. In studies that consider non-monotonic relationships

between two variables across countries, the researcher can apply the research process employed in this thesis to identify the ideal levels of the explanatory variables for the dependent variable and benchmark each country against the other countries in which the relationship is the strongest (i.e. countries in the top quartile).

5 Results

This section presents the estimation results of the empirical models utilised in this study, synthesises the findings in relation to the banking sector depth determinants models as well as benchmarks the banking sectors in the GCC States. In doing so, author reports the results of the mixed effects models associated with the banking-growth relationship, highlights the countries in the top quartile based on the mixed effects models results, discusses the findings of the System GMM dynamic panel data models utilised for determining the factors influencing the banking sector depth in the top quartile countries, and benchmarks the banking sectors across the GCC region using the regression equations of the banking sector determinants models.

5.1 Banking-Growth Nexus using the Mixed Effects Models

As discussed in the Hypotheses and Methodological Framework section, the mixed effects model is adopted in this study to estimate the relationship between banking sector depth and long-term economic growth in order to obtain the slope coefficient for individual countries. The mixed effects models are estimated using all the different combinations, given the four different economic growth indicators and five banking sector depth measures. Applying the same controlling variables, the results of the 20 estimated models are reported in Tables 50 and 51. On the basis of the estimated results, the banking-growth nexus is found to be statistically significant at the 10% confidence level in models 1, 3, 4, 5, 6, 8, 9, 10 15, and 18.

Table 50: Banking-Growth Nexus Mixed Effects Models 1 to 10

Model Number	1	2	3	4	5	6	7	8	9	10
Dependent Variable	Real GDP per Capita					Real GNI per Capita				
Independent Variables										
1st Lag of Credit to Private Sector to GDP Ratio	0.129*** (0.028)					0.1049*** (0.033)				
1st Lag of Bank Assets to GDP Ratio		0.0014 (0.022)					-0.0206 (0.019)			
1st Lag of Bank Liabilities to GDP Ratio			0.0561*** (0.015)					0.0447*** (0.016)		
1st Lag of Money Supply to GDP Ratio				0.2044*** (0.04)					0.187*** (0.048)	
1nd Lag of Broad Money Supply to GDP Ratio					0.1545** (0.068)					0.1432* (0.078)
1st Lag of Initial Real GDP per Capita	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)	0*** (0)
1st Lag of Gross Secondary School Enrolment Rate	0.2316*** (0.027)	0.3418*** (0.034)	0.3321*** (0.032)	0.1966*** (0.024)	0.1742*** (0.036)	0.2164*** (0.033)	0.3871*** (0.042)	0.3837*** (0.04)	0.2008*** (0.031)	0.2103*** (0.044)
1st Lag of Inflation Rate	-0.1638*** (0.024)	-0.1544*** (0.027)	-0.1461*** (0.028)	-0.1811*** (0.021)	-0.1068** (0.044)	-0.1294*** (0.03)	-0.1398*** (0.035)	-0.1296*** (0.035)	-0.1615*** (0.028)	-0.0585 (0.048)
1st Lag of Government Consumption to GDP Ratio	-0.0142 (0.042)	-0.1527*** (0.048)	-0.1942*** (0.05)	-0.103*** (0.038)	0.1138* (0.068)	-0.0101 (0.054)	-0.1549*** (0.059)	-0.2107*** (0.062)	-0.1017** (0.05)	0.1156 (0.081)
1st Lag of FDI to GDP Ratio	0.0283*** (0.008)	0.0173* (0.01)	0.014 (0.01)	0.0206*** (0.007)	0.0219* (0.011)	0.0271*** (0.01)	0.0041 (0.012)	0.0041 (0.013)	0.0137 (0.009)	0.0237* (0.012)
1st Lag of Trade to GDP Ratio	0.2295*** (0.041)	0.285*** (0.051)	0.2447*** (0.049)	0.2454*** (0.038)	0.1936*** (0.074)	0.3185*** (0.051)	0.3135*** (0.063)	0.2559*** (0.065)	0.3081*** (0.051)	0.26*** (0.084)
Constant	5.6085*** (0.235)	5.6278*** (0.28)	5.9261*** (0.284)	5.5741*** (0.236)	5.3129*** (0.408)	5.3826*** (0.284)	5.4398*** (0.341)	5.7982*** (0.355)	5.3795*** (0.288)	5.0239*** (0.435)
Observations	644	583	564	625	234	496	444	430	477	197
Countries	158	146	145	158	75	123	113	111	123	63

The table reports the regression results of the mixed effects models for 184 countries. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. The z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table 51: Banking-Growth Nexus Mixed Effects Models 11 to 20

Model Number	11	12	13	14	15	16	17	18	19	20
Dependent Variable	Private Investment to GDP Ratio					Investment to GDP Ratio				
Independent Variables										
1st Lag of Credit to Private Sector to GDP Ratio	-0.0447 (0.045)					-0.029 (0.023)				
1st Lag of Bank Assets to GDP Ratio		-0.0143 (0.029)					0.0008 (0.014)			
1st Lag of Bank Liabilities to GDP Ratio			0.005 (0.029)					-0.0248* (0.013)		
1st Lag of Money Supply to GDP Ratio				-0.0295 (0.065)					0.0231 (0.033)	
1nd Lag of Broad Money Supply to GDP Ratio					-0.2258* (0.123)					-0.0436 (0.071)
1st Lag of Initial Real GDP per Capita	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0** (0)	0*** (0)	0** (0)	0*** (0)	0 (0)
1st Lag of Gross Secondary School Enrolment Rate	0.1322*** (0.047)	0.1674*** (0.053)	0.1511*** (0.052)	0.1197** (0.049)	0.0719 (0.074)	0.0511* (0.026)	0.051* (0.029)	0.0545** (0.028)	0.0315 (0.027)	0.0093 (0.046)
1st Lag of Inflation Rate	-0.1336** (0.058)	-0.0936 (0.059)	-0.0871 (0.06)	-0.1347** (0.061)	-0.2121** (0.104)	-0.1235*** (0.033)	-0.1179*** (0.034)	-0.1224*** (0.032)	-0.1189*** (0.034)	-0.0612 (0.066)
1st Lag of Government Consumption to GDP Ratio	-0.0605 (0.087)	0.0037 (0.086)	0.003 (0.091)	-0.0326 (0.09)	-0.2132 (0.154)	-0.0426 (0.047)	-0.0004 (0.047)	-0.0036 (0.047)	-0.0443 (0.047)	-0.0596 (0.095)
1st Lag of FDI to GDP Ratio	0.039* (0.02)	0.0436** (0.021)	0.0445* (0.023)	0.0266 (0.02)	0.001 (0.025)	0.0129 (0.01)	0.0142 (0.011)	0.0148 (0.011)	0.0099 (0.011)	0.0039 (0.016)
1st Lag of Trade to GDP Ratio	0.0382 (0.083)	0.0364 (0.086)	0.028 (0.086)	0.0776 (0.081)	0.3019** (0.122)	0.0647 (0.043)	0.0293 (0.044)	0.0359 (0.043)	0.0531 (0.042)	0.1324* (0.079)
Constant	2.2978*** (0.37)	1.9528*** (0.393)	2.0097*** (0.398)	2.0916*** (0.379)	2.4719*** (0.56)	2.8993*** (0.211)	2.8666*** (0.225)	2.8607*** (0.221)	2.8543*** (0.218)	2.8269*** (0.403)
Observations	291	266	254	292	128	500	447	433	481	200
Countries	80	74	72	80	44	123	113	111	123	63

The table reports the regression results of the mixed effects models for 184 countries. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. The z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

The individual countries' slope coefficients associated with the statistically significant models are then used to rank the countries accordingly—i.e. in accordance with the size of their slope coefficient in each model—from the highest to the lowest. By assigning a point to each country in the top quartile, summing the points for each country, and ranking countries by the number of points, countries in which the banking sector exerts the highest positive effect on long-term economic growth can be identified. Using the average number of countries in each statistically significant mixed effect model, Table 52 lists the names and scores of the countries in the top quartile.

Table 52: Countries with Most Positive Banking Sectors for Economic Growth

1 Japan	3 Switzerland	5 Israel	7 Armenia	7 Hong Kong SAR, China
2 Austria	4 Cameroon	5 Malaysia	7 Belarus	7 Italy
2 Korea, Rep.	4 Russian Federation	5 United States	7 Botswana	7 Kuwait
3 France	5 Belgium	6 Azerbaijan	7 Congo, Dem. Rep.	7 Malta
3 Latvia	5 Brunei Darussalam	6 Bahamas, The	7 Congo, Rep.	7 Panama
3 Mauritius	5 China	6 India	7 Egypt, Arab Rep.	7 Trinidad and Tobago
3 Sri Lanka	5 Germany	6 Mexico	7 Equatorial Guinea	

5.2 Banking Sector Depth Determinants: System GMM for Dynamic Panel Data Models

To investigate the factors determining the level of banking sector depth in economies in which the banking sector promotes long-term economic growth the most, we use the data that correspond to the countries listed in Table 52. The banking sector depth measures are regressed on a broad set of factors associated with the economic structure and growth, demography, and banking sector stability, efficiency and competition, as well as the governance, institutional and legal settings. Table 53 reports the results of the reduced models using the general-to-specific approach.

Table 53: Banking Sector Depth Determinant Models

Model Number	21	22	23	24
Dependent Variable	Bank Credit to Private Sector to GDP Ratio	Bank Assets to GDP Ratio	Bank Liabilities to GDP Ratio	Money Supply to GDP Ratio
Independent Variables				
1st Lag of Bank Credit to Private Sector to GDP Ratio	0.9127*** (0.028)			
1st Lag of Bank Assets to GDP Ratio		0.6481*** (0.132)		
1st Lag of Bank Liabilities To GDP Ratio			0.6712*** (0.150)	
1st Lag of Money Supply to GDP Ratio				0.8814*** (0.072)
1st Lag of Z-Score				0.1516* (0.089)
1st Lag of Net Interest Margin			-0.3296** (0.157)	
1st Lag of Bank Concentration Ratio	-0.1628* (0.089)			
1st Lag of Saving to GDP Ratio				-0.2512*** (0.091)
1st Lag of Consumption to GDP Ratio				-0.3989** (0.165)
1st Lag of Consumer Price Index		-0.2305* (0.137)		
Political Stability & Absence of Violence			0.2568** (0.123)	
Rule of Law		0.3961** (0.158)		
Regulatory Quality	0.0433* (0.024)			
Constant	1.0131*** (0.360)	-0.7408*** (0.287)	0.3231 (0.326)	2.5223*** (0.913)
Observations	392	502	374	375
Groups	31	32	33	32
Instruments	27	34	31	29
AR(1)	-2.61	-2.1	-2.68	-3.17
AR(1) p-value	0.009	0.036	0.007	0.002
AR(2)	0.3	0.49	-0.38	-0.65
AR(2) p-value	0.767	0.626	0.706	0.515
Sargan Overidentification Test	34.17	37.37	57.01	21.86
Sargan p-value	0.063	0.167	0.001	0.588
Hansen Overidentification Test	23.02	30.78	25.78	19.35
Hansen p-value	0.46	0.426	0.531	0.733

The table reports the regression results of the selected System GMM for the dynamic panel data models investigating the relationship between bank sector depth measures and their determinants. The initial general models employed include all the explanatory variables, which are then reduced to the selected models reported in the table, using the general-to-specific approach as described in section 4.5 above. The models employ the annual data for the 34 countries listed in Table 52 over the period from 1960 to 2011. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

The results of model number 21 indicate that the current level of the bank credit extended to the private sector relative to the size of the economy is determined by its lagged value, the level of banking sector concentration, and the regulatory quality. Furthermore, the estimation results suggest that a 1% increase in the assets of the three largest banks, as a share of the total commercial banking assets, reduces the credit to private sector to GDP ratio by 0.163%. This is while a 0.10 improvement in the regulatory indicator, which along with the other Worldwide Governance Indicators

ranges from -2.5 to 2.5 approximately, results in a 0.433% increase in the credit to private sector to GDP ratio.

In the dynamic regression model, investigating the factors influencing the bank assets to GDP ratio, the CPI and rule of law are statistically significant at the 10% and 5% levels of significance respectively. The slope coefficient of the CPI implies that a 10% acceleration in the inflation measure leads to a 2.305% drop in the size of the bank assets relative to the size of the economy. The results also reveal that the rule of law has a relatively considerable effect on the banking sector depth measure—i.e. a 0.10 rise in the rule of law index is expected to increase the level of bank assets to GDP ratio by 3.961%. For instance, a 0.10 surge in the rule of law index is likely to lift a country's bank assets to GDP ratio from 25% to 26% *ceteris paribus*.

Model 23 (see Table 53) suggests that the bank liabilities to GDP ratio is determined by its lagged level, the net interest margin, and political stability. The net interest margin of the banking sector is negatively linked to the level of the banking sector depth. The evidence obtained indicates that a 1% growth in the net interest margin is associated with a 0.330% drop in the bank liabilities to GDP ratio. In contrast, the political stability is positively associated with the banking sector depth measure. An improvement in political stability is also expected to raise the bank liabilities to GDP ratio.

In Table 53, model 24 is the banking sector depth determinant model using the money supply to GDP ratio as the dependent variable. The results indicate that in addition to the previous reading of money supply to GDP ratio, the banking sector stability measured by the z-score, the levels of consumption, and the levels of savings are found to be statistically significant determinants of the banking sector depth. In particular, a 1% increase in the z-score leads to a 0.152% growth in the proportion of the money supply to GDP ratio. Both consumption and savings are found to be negatively associated with banking sector depth. The model suggests that when the consumption to GDP ratio level expands by 1%, the money supply as a share of GDP falls by 0.399%. Similarly, a 1% higher level of savings to GDP ratio is anticipated to drive the banking sector depth measure down by 0.251%. The z-score is statistically significant at the 10%

test level, whilst the consumption to GDP and savings to GDP ratios are found to be statistically significant at the 5% and 1% test levels respectively.

Due to the lack of data, the banking sector depth model that employs the broad money supply to GDP ratio for the countries in the top quartile is not estimated.

5.3 Results Synthesis

The findings of all the four models reported in Table 53 indicate that the first lagged values of the dependent variables are relevant. The slope coefficients of the first lag of the banking sector depth measures ranged from 0.648 in the model investigating the bank assets to GDP ratio determinants to 0.913 in the model associated with the bank credit to private sector to GDP ratio.

The results also reveal that a number of the banking sector depth stability, efficiency and competition variables are statistically significant in three out of four banking sector depth determinant models. In the model concerned with the credit to private sector to GDP ratio, the level of banking sector competition measured by bank concentration is found to be significant with the slope coefficient suggesting that higher competition levels promote the sector development. The banking sector efficiency—approximated by the net interest margin—is a determinant of the bank liabilities to GDP ratio in countries with banking sectors that promote long-term economic growth the most. In addition, bank stability has transpired to be an important factor that conditions financial depth in the sector. In model 24, the z-score is shown to be positively associated with the money supply to GDP ratio.

Out of the various macroeconomic and demographic variables included in the general models, three measures are found to be of statistical significance in the banking sector depth determinant models. The first is the CPI, which revealed that higher levels of inflation deter the development of the banking sector. The second and the third are linked to the savings and consumption levels within the economy. Both the savings to GDP ratio and the consumption to GDP ratio are found to be negatively associated with the money supply to GDP ratio.

Finally, variables related to the governance, institutional, and legal indicators' category transpired to be important for economies in which the banking sector has been instrumental in precipitating the highest levels of economic growth. The results of three banking sector depth determinant models demonstrate that regulatory quality, rule of law, and political stability are all positively linked to the banking sector depth proxies.

5.4 Benchmarking the Banking Sector Depth across the GCC States

This subsection reports the findings of the banking sector depth benchmarking for each of the Gulf States. The regression equations of the banking sector depth determinant models for countries with the strongest banking-growth positive relationships are used in the benchmarking. The benchmarking results for each model are presented for each GCC country after introducing the relevant figures associated with the explanatory variables.

Table 54: Credit to Private Sector to GDP Ratio Benchmarking Model

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Average
Credit to Private Sector	68%	75%	42%	45%	39%	75%	57%
Bank Concentration	81%	90%	69%	83%	56%	60%	73%
Regulatory Quality	0.70	0.10	0.30	0.50	0.00	0.50	0.35
Calculated Measure	65%	68%	43%	44%	41%	75%	
Actual Measure	69%	61%	40%	39%	34%	64%	
Banking Dev. Status	Overdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	

The calculated measures are derived by inserting the actual data for each country in the benchmarking equation. The actual measures are the latest banking sector depth levels for each country.

Calculating the benchmark credit to private sector to GDP ratio for the GCC countries entails obtaining the prior value of the ratio as well as the bank concentration and regulatory quality. Table 54 lists the explanatory variable levels for each country in the region required to calculate the benchmark credit to private sector to GDP ratio for the year 2011. Among the Gulf States, the UAE has the highest calculated credit to private sector to GDP ratio, while Saudi Arabia has the lowest. The results are due to the higher lagged banking sector depth measure level, lower bank concentration, and above average regulatory quality in the UAE. In Saudi Arabia, despite its banking sector being the most competitive across the region, its calculated sector depth measure is the smallest as a result of the low credit to private sector to GDP ratio and regulatory quality index in 2010. Comparing the calculated values with the actual figures for 2011

reveals that the banking sectors in all the regions with the exception of Bahrain are considered to be underdeveloped as the actual banking sector depth measures are below those calculated by the model.

Table 55: Bank Assets to GDP Ratio Benchmarking Model

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Average
Bank Assets	119%	22%	7%	19%	10%	22%	33%
CPI	1.96%	4.50%	3.20%	-2.43%	5.34%	0.88%	2.24%
Rule of Law	0.50	0.60	0.60	0.90	0.30	0.40	0.55
Calculated Measure	65%	22%	11%	24%	12%	21%	
Actual Measure	103%	18%	9%	19%	8%	20%	
Banking Dev. Status	Overdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	

The calculated measures are derived by inserting the actual data for each country in the benchmarking equation. The actual measures are the latest banking sector depth levels for each country.

Similar findings in relation to the status of the banking sector development in the GCC countries are reported under the bank assets to GDP ratio benchmarking model. Table 55 provides the 2010 figures of the bank assets to GDP ratio, the CPI, and the rule of law measure. In comparison to the other Gulf States, Bahrain had the largest bank assets to GDP ratio while Oman had the smallest. The inflation measure averaged in the GCC region at 2.2%, with all countries registering positive CPI numbers except Qatar. Finally, with respect to the rule of law, all the Gulf States score below 1 and averaged at 0.55. Substituting the explanatory variables data into the benchmarking model for each State shows that once again the banking sectors in Kuwait, Oman, Qatar, Saudi Arabia, and the UAE are underdeveloped as the actual banking sector depth figures fall below the calculated ones.

Table 56: Bank Liabilities to GDP Ratio Benchmarking Model

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Average
Bank Liabilities	117%	22%	6%	31%	5%	26%	34%
Net Interest Margin	2.09%	3.01%	3.69%	3.20%	2.88%	3.04%	2.98%
Political Stability	-1.00	0.30	0.40	1.20	-0.50	0.90	0.22
Calculated Measure	49%	19%	8%	30%	6%	25%	
Actual Measure	103%	18%	6%	26%	3%	23%	
Banking Dev. Status	Overdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	

The calculated measures are derived by inserting the actual data for each country in the benchmarking equation. The actual measures are the latest banking sector depth levels for each country.

In the bank liabilities to GDP ratio benchmarking model, the previous levels of the banking sector depth measure, the banking sector's net interest margin, and the current

political stability score, determine the status of the sector development. Among the GCC countries, the calculated bank liabilities to GDP ratio is the highest in Bahrain and the lowest in Oman. In the case of Bahrain, this is due to the size of the previous reading of the ratio standing at 117%—vis-à-vis a GCC average of 34%—and its low net interest margin levels, despite having the lowest political stability score. In contrast, Omani banks have the lowest liabilities relative to the size of the State's economy and enjoy the highest net interest margins compared to their peers in the region. As in the first two benchmarking models, all the banking sectors in the GCC countries are considered to be underdeveloped with the exception of Bahrain.

Table 57: Money Supply to GDP Ratio Benchmarking Model

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE	Average
Money Supply	81%	77%	39%	58%	55%	75%	64%
Z-Score	18	19	14	25	14	21	18.69
Consumption	41%	29%	32%	16%	32%	59%	35%
Saving	30%	53%	26%	70%	43%	33%	42%
Calculated Measure	90%	87%	52%	83%	62%	73%	
Actual Measure	74%	65%	37%	50%	49%	65%	
Banking Dev. Status	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	Underdeveloped	

The calculated measures are derived by inserting the actual data for each country in the benchmarking equation. The actual measures are the latest banking sector depth levels for each country.

Table 57 presents the last banking sector depth benchmarking model. The model employs the money supply to GDP ratio as its dependent variable. The prior levels of the banking sector depth measure ranged from 39% in Oman to 81% in Bahrain. The average z-score for the region is 18.69 with Qatari banks considered the most stable. Relative to the size of the economy, the UAE had the highest levels of consumption in 2010 while Qatar had the lowest. The savings as a share of GDP ranged from 30% in Bahrain to 70% in Qatar and averaged at 42% for the GCC States. As Table 57 reveals, all the countries across the Gulf have underdeveloped banking sectors.

In summary, the four banking sector depth benchmarking models' results consistently show that the banking sector in all the GCC countries is considered to be underdeveloped with the exception of Bahrain which in three models is deemed to be overdeveloped.

6 Discussion & Further Research

The existing literature on banking sector development determinants suggests that the factors related to the banking sector structure, macroeconomic and demography, as well as governance and institutional settings, influence the level of banking sector depth. Most importantly, having a lucid picture of the right determinants of banking sector development is instrumental in the context of policy making.

The already established findings in this research field—in conjunction with the evidence generated in Project II—suggest that the relationship between the banking sector depth and long-term economic growth is non-linear (Arcand et al., 2012). This prompted scholars to investigate further both the theoretical and empirical aspects of the optimal level of banking sector development for economic growth (see for instance Barajas et al., 2013a; Beck et al., 2012). On the empirical front, the majority of the studies employ benchmarking models that utilise cross-country analysis across different regions. The results, accordingly, are based on groups of countries, but disregard the significance of the finance-growth relationship in those countries. This study purports to overcome this pitfall by addressing the question "What are the banking, macroeconomic, and governance factors that influence the banking sector depth in countries with the strongest banking-growth relationship?"

In doing so the author will first try to establish the factors that are instrumental in conditioning the development of the banking sectors in countries in which economic growth thrives as the banking sector develops and second, by using regression analysis, will benchmark the banking sector depth in the GCC States in order to provide policy recommendations. Prior to engaging with the empirical analysis it is useful to provide a brief account of the rationale behind the intention to investigate the banking sector development in the GCC countries.

Most of the economies in the Gulf region are highly dependent on hydrocarbon and its related industries for their economic output and government revenues. In 2011, the hydrocarbon sector accounted for 49% of the region's GDP and its receipts amounted to

87% of the total government revenues in all six states (QNB, 2012). As discussed in more detail in Project I, the high level of dependency on hydrocarbon resources exposes the region to increased fluctuations in the levels of economic growth, government revenues, and exports. In addition, such an economic structure is unsustainable since natural resources are finite. Further, the dependency on crude oil and natural gas makes the GCC States susceptible to the natural resources curse where an economy with natural resources fails to grow faster than economies without such resources. Finally, the prices of natural resources not only depend on consumer income and preferences but also on the availability of alternative goods. Accordingly, the discovery of alternative resources and advances in technology could make the hydrocarbon resources redundant.

This economic structure has urged policymakers across the region to undertake policies and strategies that aim at diversifying their economies away from the hydrocarbon sector to ensure sustainable real economic growth over the long-term. One potential sector that can contribute to the diversification and long-term economic growth is the financial sector. The financial sector in the GCC region is the third largest—after the hydrocarbon and public sectors—accounting for 10% of GDP in 2011 (QNB, 2012). Despite that, the banking sectors in most of the GCC States are still deemed to be underdeveloped. Thus the development of the sector can contribute directly to long-term economic growth as well as facilitate the growth of the rest of the sectors by providing the long-term funding necessary for their expansion.

6.1 Discussion of the Results

6.1.1 Banking Sector Depth Determinants

The results associated with models 21 to 24 address the first research question by identifying the banking, macroeconomic, as well as governance and institutional factors that determine the depth of the banking sectors in countries in which the banking-growth relationship is manifested at its highest possible level.

The first banking sector structure factor that influences the level of sector depth is competition. The results of model 21 indicate that the more competitive a banking sector, the more it is associated with higher levels of banking sector credit to private sector as a share of GDP. The findings are similar to those of Barajas et al. (2013a)

where the data for as many as 161 countries are used to benchmark the banking sectors across the globe based on their structural characteristics. Barajas et al. (2013a) show that the banking competition measured by the asset concentration of the largest five banks is negatively linked to financial deepening. However, what differentiates the results reported in this study from those of Barajas et al. (2013a) is that here the bank concentration measure accounts for the largest three banks rather than the largest five banks. In fact, the 5-bank assets concentration variable is statistically insignificant across all banking sector depth determinant models.

Another difference between the two studies is that this study only considers the 34 countries in the top quartile of the banking-growth relationship using a predetermined selecting process. In contrast, Barajas et al. (2013a) use the available data of all countries. As this thesis approach to selecting the countries included in examining the determinants of the banking sector depth is novel to the literature, this difference will constantly be present when comparing the method employed in selecting countries here to those in other papers in the literature.[30]

The second banking sector structure determinant of sector depth is the bank's interest rate margin. The bank efficiency measure is found to have an inverse relationship with the bank liabilities to GDP ratio. The findings are in line with the theory as in a well developed and competitive market, profit margins—and in this case, net interest margins—are lower. Demirgüç-Kunt and Huizinga (1999) find that the higher the bank assets to GDP ratios, the lower the interest rate margins. In the banking sector development determinant literature, no other study to the best of the author's knowledge reports the opposite, where efficient banking sectors encourage banking sector depth, despite its theoretical plausibility. In competitive markets, banks faced with lower interest rate margins can maintain their rates of returns on equity by extending more credit which, in turn, increases their financial leverage and the size of the banking sector to GDP. The latter assumes that there is a demand for new credit in the economy and the increase in the supply will not reduce the net interest margins substantially.

[30] To avoid repetitiveness, the same point is not stated again when the findings of this study are compared to those of the literature.

The results also show that in countries in which the banking sector deepening contributes the most to long-term economic growth, the banking sector stability is found to be significant for the sector deepening. The lower the probability of banking sector insolvency the more developed the sector, according to model 24. One possible explanation is that banks with higher credit ratings are in a better position to borrow at lower rates to fund their growth in assets than banks with lower credit ratings. In relation to the respective benchmarking literature, the findings are novel.

To summarise, the findings pertaining to the banking sector structure suggest that a more competitive, efficient, and stable banking sector encourages the deepening of the sector in countries in which the banking sector development stimulates long-term economic growth the most.

In relation to the macroeconomic factors that affect the development of the banking sector, the findings illustrate that inflation hinders the sector's development. The negative relationship between CPI and the bank assets to GDP ratio confirms the findings of Boyd et al. (1996, 2001), Chinn and Ito (2006), Djankov et al. (2007), and Barajas et al. (2013a), that inflation deters banking sector deepening. The sign of the CPI coefficient is as expected due to the negative effect of higher inflation rates on the real return on money and assets in general. The lower real rate of return under informational frictions in the credit markets reduces agents' incentive to lend and increases their incentive to borrow (Boyd et al., 2001).

The rest of the macroeconomic factors explaining variation in the level of banking sector depth in the banking-growth nexus top quartile countries are savings to GDP ratio and consumption to GDP ratio. Model 24 reveals that the higher the household final consumption expenditure as a share of GDP, the lower the money supply to GDP ratio. More consumption levels are likely to reduce the money supply (M2) as bank deposits are withdrawn to facilitate payments to the goods and services' suppliers inside and outside the country. This finding is novel to the literature, as researchers examining the

determinants of banking sector development do not include measures of consumption in their studies.

Similarly, the savings to GDP ratio is found to be negatively linked to the banking sector depth measure of money supply to GDP ratio. Since the savings to GDP ratio is calculated as the GNI less total consumption plus net transfers relative to GDP, the ratio can be viewed as the total size of investments to GDP ratio. As in the case of consumption, the larger the size of investment expenditure the more funds are required to be withdrawn from the banking sector. Despite that, Beck et al. (2012) highlight the theoretical underpinnings of savings as a structural variable that determines the supply and demand for the financial services; empirical studies in the literature overlook the importance of this variable when investigating the banking sector development determinants and benchmarking the sector.

In a nutshell, examination of the macroeconomic factors demonstrates the negative influence of inflation, consumption and savings on banking sector development in economies with the strongest banking-growth links.

In addition, the banking sector depth determinant models suggest that both the governance and institutional factors are instrumental in affecting sectoral deepening. The first factor is political stability and the absence of violence. The findings of model 23 confirm the previous results of Girma and Shortland (2004) in which political stability contributes to the development of the banking sector. For a banking sector to be able to promote economic activities and growth, a conducive political environment, in which regime stability and absence of violence prevail, is a precondition.

The second governance and institutional factor is the rule of law. The results of model 22 illustrate the significance of the rule of law for banking sector deepening. This is in line with the findings of the established literature which explores the importance of investors' protection, law origins, and law enforcements for the development of the financial sector, led by the seminal work of La Porta et al. (1997, 1998). In particular, the findings of this thesis demonstrate that the higher the extent to which agents have

confidence in and abide by the rules of society—including the quality of contract enforcement, property rights, and courts—the more developed the banking sectors are in the 34 countries investigated.

The final governance and institutional factor that contributes positively to the deepening of the banking sector is regulatory quality. The results of model 21 indicate that in countries in which banking sector development contributes the most to long-term economic growth, the perception of the governments' ability to formulate and implement sound policies and regulations that permit and promote private sector development is positively associated with the sector depth. Apart from Huang (2010a) who includes the measure as an element of a governance index, no other study in the banking depth determinant and benchmarking literature employs the regulatory quality measure. The findings of this present study in relation to regulatory quality, political stability and absence of violence, and rule of law, lend support to those of Huang (2010a) which illustrates that good governance stimulates the banking sector development.

6.1.2 Banking Sector Development in the GCC States

In addressing the second research question of this study, the banking sector depth models for the countries with the strongest banking-growth nexus are used to assess the status of the banking sector development in the GCC countries. The findings are, to a great extent, coherent. The banking sectors in five of the six States are considered to be underdeveloped. Considering the history of the banking sectors in the GCC, the results are not surprising.

Bahrain, as the only country with an overdeveloped banking sector in most of the models, has been considered a regional financial hub since the early 1980s. According to Gerakis and Roncesvalles (1983), the policy of licensing offshore banking units in Bahrain in October of 1975 attracted as many as 53 international banks to the island in three years and took the total assets of the banking system to over USD 23 billion by the end of 1978 which is comparable to that of Singapore at the time. The development of the offshore banking sector had an inevitable spillover effect on the local commercial

banking system and its development via the transfer of the know-how and best practices within Bahrain. In addition, at the time, the status of being the financial hub of the region encouraged the regulatory authorities to open up the local commercial banking sector and adopt regulations that stimulated its development.

In comparison, the closed market policies followed for years by the other GCC countries might explain the underdevelopment of their banking sectors. Srairi (2011b) argues that economic reforms and liberalisation only accelerated after the year 2000. During the first decade of the new millennium, the governments across the region undertook various economic and financial reforms, including trade liberalisation, opening the banking sector for regional and international banks, encouraging FDI, liberalising interest rates, strengthening the central banks' supervisory capacity, and adopting regulations that promote their countries to move towards more market-based economies.

6.1.3 Policies to Accelerate the Banking Sector Development in the Region

To address the third research question that investigates the channels by which the banking sector development levels of the Gulf States converge to those of the countries with strongest banking-growth relationships, Table 58 needs to be considered. The table compares the banking sector depth and structure, macroeconomic, and governance and institutional measures of the GCC States and those of the 34 countries in Table 52 (hereafter referred to as the top quartile countries). The figures are weighted averaged using the total real GDP level for each country to ensure that the differences in the size of the economies are accounted for.

Table 58: Banking Sector Development Determinants in the GCC & Top Quartile Countries

Variable	GCC States	Top Quartile Countries
Banking Sector Depth Ratios		
Bank Credit to Private Sector to GDP Ratio (%)	45.02	82.97
Bank Assets to GDP Ratio (%)	15.13	24.41
Bank Liabilities To GDP Ratio (%)	13.99	19.71
Money Supply to GDP Ratio (%)	54.35	133.94
Banking Stability, Efficiency & Competition Measures		
Z-Score	18.15	20.00
Net Interest Margin (%)	3.01	2.54
Bank Concentration Ratio (%)	65.11	48.21
Macroeconomic & Demography Variables		
Saving to GDP Ratio (%)	39.89	24.42
Consumption to GDP Ratio (%)	30.97	59.15
Consumer Price Index (%)	3.96	3.25
Governance, Institutional & Legal Indicators		
Political Stability & Absence of Violence	0.12	0.38
Rule of Law	0.33	1.04
Regulatory Quality	0.21	0.97

Compared to the top quartile countries, the GCC countries have less developed banking sectors. For instance, the weighted average credit to private sector to GDP ratio is 45.02% in the GCC compared to 82.97% in the top quartile countries in 2011. Improving the levels of banking sector depth in the region requires policies that would influence the banking sector structure, the macroeconomy, and the governance and institutional setting.

The measures associated with banking stability, efficiency and competition can be improved in the GCC States, given the levels of the top quartile countries group. The higher levels of net interest margins in the region suggest that banks are not as efficient in taking deposits and generating loans relative to their peers in the top quartile countries. This also suggests that GCC's banks possess more market power, which allows for the extraction of greater margins via setting deposit rates lower and loan rates higher. The latter is supported to some extent by the bank concentration ratio.

In the Gulf area, the assets of the largest three banks account for over 65% of the total assets of the sector, compared to less than 49% in the top quartile countries. Converging the levels of the banking sector depth in the region to those with the deepest banking-growth nexus thus requires policies that fuel competition in the banking sector, reducing the dominance of the largest banks in the sector.

Despite the higher interest margins and lower competition levels, the z-score indicates that the banking sectors in the region are less stable than their peers ranked in the top quartile countries. Regulations that promote greater banking sector stability are bound to contribute to the deepening of the banking sector in the region.

In contrast to the other factors, the macroeconomic measures are somewhat more favourable for the six Gulf States. The inflation rate in the region in 2011 was running slightly higher than in the group of 34 countries. The inflation levels in the GCC are deemed to be well controlled by the authorities, with an average CPI rate below 3.80% over the last five decades. Further measures that can reduce the inflation rate to even lower levels, however, can benefit the development of the banking sector in the area.

The consumption levels as proportionate to the size of the economy across the region are substantially smaller than in the top quartile countries. One conceivable explanation is not the lack of consumption among households but the larger income per capita relative to consumption. The higher income levels both at the individual as well as the government levels allow the Gulf countries to meet their consumption needs and direct excesses to their bank accounts and sovereign wealth funds as savings. In fact, the savings as a share of GDP are above 40% in those countries compared with less than 25% in the top quartile countries. The deepening of the banking sector requires the moderation of the levels of savings in the Gulf.

The figures in Table 58 suggest that improving the governance and institutional settings in the region ought to be on the agenda of policymakers aiming at developing their banking sectors further. All three governance, institutional, and legal indicators are weaker in the region than in the top quartile countries. The political stability and

absence of violence indicator in the GCC is the closest to that of the top quartile group with a difference of 0.26, while the regulatory quality is the most distant with a 0.77 difference. Despite that, bridging the gap in the case of political stability and absence of violence is expected to have a greater positive impact on the development of the banking sector in the Gulf than in the case of regulatory quality. The rule of law, however, should be given priority when considering the sector development as it has the greatest influence among the governance, institutional, and legal factors.

6.2 Contribution to the Literature & Policy

The study contributes to both theory and practice. The contribution to the literature consists of presenting a novel benchmarking approach and identifying the determinants of the banking sector depth in the top quartile countries. The research contributes to practice and policy by assessing the status of the banking sector development in the GCC, highlighting factors significant for the sector development in the region, and evaluating how changes in those factors affect the banking sector depth going forward.

Studies in the literature concerned with the financial sector development benchmarking and the concept of the financial possibility frontier employ benchmarking models that assess the status of financial sector development in a State by using empirical models, the results of which are based on the means for countries within a given region/group or even broader for all the countries in the world (see Barajas et al., 2013a, for instance). This study instead identifies and uses the data for the countries in which the positive relationship between the banking sector and long-term economic growth is manifested at its highest possible level.

In addition, the benchmarking process implemented in this project—which utilises different empirical models such as the mixed effects and the dynamic panel data models—can be applied in different disciplines where the researcher is concerned with identifying determinants of a certain phenomenon. For example, a scholar interested in investigating the factors influencing the quality of higher education in countries in which undergraduate degrees have the most positive effect on earnings can use the

benchmarking process to assess the level of higher education quality in certain countries in relation to those in which university graduates enjoy higher incomes.

The project's findings also extend the research of the banking sector depth determinants by exploring the banking sector structure, macroeconomics, and governance, institutional, and legal factors that are significant for the sector development in countries with the deepest banking-growth relationship. Although the factors are similar to those found to be significant in the broader literature, the findings of this study identify the ones that are more relevant for countries that aim to develop their banking sectors to spur long-term economic growth.

In relation to the contribution to practice and policy, the thesis benchmarks the banking sector in the six GCC countries. Such implementation provides policymakers across the region with valuable information about the status of their sectors. Eager to diversify their economies away from the hydrocarbon sector and sustain long-term economic growth, the governments in the region can capitalise on this research's findings to stimulate their banking sectors further. This study identifies the factors that can be used to enhance the sector development. Each of the Gulf countries can evaluate their banking sector structure, macroeconomic, and governance, institutional, and legal factors in relation to those of the top quartile countries and the importance of each factor for their sector development. The evaluation, with some further research, can be translated into regulations and policies that affect some or all the banking sector depth determinants in each of the Gulf States.

Finally, as the next section shows, the project conducts a simulation exercise that forecasts the levels of banking sector depth in each of the GCC States, given the changes in the levels of the determinant factors. This can help policymakers project the future levels of the sector development in the region if certain regulations and policies that converge the banking sector structure, macroeconomic, and governance, institutional and legal factors to those of the top quartile countries are undertaken. Policymakers can subsequently employ the findings of Project II in connection with the

relationship between the banking sector depth and long-term economic growth to forecast the final effect of their policies on the income growth levels.

6.3 Research Relevance & Limitations

The research and its findings are relevant to the development of the literature and the formation of policy. The relevance reflects the research's contributions discussed in the previous subsection and its timing. After the Global Financial Crisis of 2008-2009, the finance-growth literature shifted its focus to exploring the optimal levels of financial development for long-term economic growth and evaluating the status of financial development in individual countries. Studies in this area used benchmarking models and applied the financial possibility frontier concept. This makes this research a natural extension to the current literature.

The study is also timely in relation to practice and policy. All the GCC member countries' governments incorporated economic diversification in their recent economic strategies and policy agendas. Despite being the third largest contributor to GDP, the banking sector, as this research shows, is underdeveloped in most of the Gulf countries. The development of the banking industry will not only contribute to economic diversification by increasing its share of the total economic output but also by potentially accelerating growth in other economic sectors that depend on debt for expansion.

Among the limitations associated with this project, two are worth highlighting. The first is related to understanding the nature of the banking sector in the top quartile countries. The research does not assess the characteristics of the banking sector in those countries beyond their depth determinants. Expanding the research in the direction of evaluating the various banking structure parameters and identifying similarities among the sectors in the top quartile countries can enrich the findings of the study in general and for the GCC States in particular.

The second limitation is linked to the assessment of the banking sector development determinants in the Gulf States. This study has identified the elements that can

contribute to the further development of the sector across the region without evaluating each State separately at the country level and providing specific policy recommendations accordingly. For instance, what explains the high levels of banking sector's concentration in Kuwait relative to its peers in the GCC States and the top quartile countries, and what are the policies recommended to stimulate competition among banks in Kuwait to stimulate the sector development? Answering such questions is beyond the scope of this study and should be added to the further research topics, which are discussed in the next subsection.

6.4 Areas for Further Research

There are several areas that can be recognised as having potential for further research. One is evaluating the banking sector development determinants and distinguishing countries with the strongest finance-growth nexus using the other three banking sector development dimensions. The current study, along with most papers in the literature, investigates those research areas using banking sector depth proxies. Further studies should consider the same questions using the banking sector access, efficiency, and stability dimensions as more cross-country data become available.

Another area that scholars can consider is assessing the level of financial development in other countries using the benchmarking process presented in this thesis; this process allows the literature to overcome the issue of benchmarking against the means of certain regions or other countries. In fact, it is desirable that future studies employ more advanced statistical methods for selecting the countries to benchmark against.

One observation related to the banking sector in the Gulf is that in spite of the relatively high levels of net interest margins and lower competition that banks enjoy across the region, banks are less stable than their peers in the top quartile countries. Researchers interested in the banking sector in the region are invited to explain this phenomenon.

Finally, the findings suggest that a set of banking sector structures, macroeconomic, and governance, institutional and legal factors determine the banking sector depth in the top quartile countries. More research is needed to understand why this set of factors is significant in those countries while other factors recognised in the literature are not. An

example is the statistical significance of the rule of law as a determinant of banking sector depth in the top quartile countries but not the English law dummy variable that is found to be important in the general literature. In addition, future research can extend the findings of this project by examining the differences in the impact of the banking sector determinants. We should be able to answer why political stability and absence of violence influence the sector development more than regulatory quality for instance.

7 Simulating the Banking Sector Development

This section intends to simulate the impact of changes in the levels of banking sector depth determinants in the GCC States on the sector depth levels. The aim is to answer the third research question of this project by illustrating how the convergence in the levels of the banking sector development determinants in the region to those of the top quartile countries affects the levels of the sector depth. Addressing this question is key for policymakers across the region interested in the potential impact of policies on the sector development and long-term economic growth.

7.1 Simulation Process

The simulation is conducted by using the regression equations of models 21 to 24, which represent the linear relationship between four banking sector depth ratios and the banking sector determinants in the top quartile countries. The factors determining the banking sector development in the GCC region are then converged to the weighted average of those of the top quartile countries over a period of five years and then kept constant at the same levels for another five years. The calculated banking sector depth ratio for each year is employed as the lagged value in the dynamic model's equation for the subsequent year.

The assumption that the factors can converge linearly over a period of five years in response to the introduction of policies and regulations is entirely hypothetical and is only assumed for the purpose of simulation. Identifying and assessing the effect of certain policies and regulations on the determinant factors is beyond the scope of this paper, as discussed above. Another assumption underlying the simulation is that for the

GCC countries with more advanced governance, institutional, and legal indices than the top quartile group weighted average, the measures are assumed to be intact throughout the simulation period. This reflects the belief that countries enjoying superior political stability and absence of violence, rule of law, and regulatory quality are interested in maintaining, if not improving, their standards.

7.2 Base Scenario

Before considering the possible effect of converging the banking sector depth determinants, it is worth considering the models' predictions based on the assumption of the *status quo* in the determinants over the same ten year period.

Table 59: Change in the Banking Sector Depth Ratios under the Base Scenario

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE
Bank Credit to Private Sector to GDP Ratio	-12%	-24%	2%	-4%	9%	-3%
Bank Assets to GDP Ratio	-22%	1%	9%	7%	3%	-1%
Bank Liabilities To GDP Ratio	-19%	-2%	4%	0%	2%	0%
Money Supply to GDP Ratio	57%	68%	174%	434%	46%	-8%
*Average**	-18%	-9%	5%	1%	5%	-1%

*the calculation of the average levels exclude the Money Supply to GDP Ratio

Table 59 suggests that by maintaining the same levels of bank concentration and regulatory quality, the bank credit to private sector to GDP ratio is expected to fall in four out of the six countries. Over the ten year period, bank assets to GDP ratios are expected to increase by less than 10% in four countries while they drop in Bahrain and the UAE when the levels of CPI and the rule of law index are assumed to remain intact. In addition, bank liabilities to GDP ratio are expected to grow in two countries, drop in two, and stagnate in the remaining two when the levels of net interest margins and the political stability and absence of violence index remain constant.

Finally, Table 59 indicates that no change in the banking sector depth determinants would result in the multiplication in the size of the money supply to GDP ratio. A closer examination of the simulation computation reveals that the relatively low levels of savings to GDP and consumption to GDP ratios in all the GCC States, with the exception of the UAE, amplify the predicted banking sector depth levels considerably. The low levels of savings and consumption ratios might be attributed to a very specific

period in the economic cycle during which they are recorded (i.e. the year 2010) where GDP levels are relatively high, or possibly to the different spending patterns in the Gulf region vis-à-vis the top quartile countries. In this context, the money supply to GDP ratios' predictions might not be suitable for drawing any insightful conclusions.

On average, Oman and Saudi Arabia are expected to see their banking sector depth ratios increase by 5% over the period, while Bahrain will lose as much as 18% of its sector depth if the related determinants are maintained at the initial levels of 2010 and 2011.

7.3 Convergence Scenario

Assuming the convergence of the banking sector development determinants in the first five years of the simulation while keeping the determinant factors constant in the second five years, Table 60 demonstrates that all the GCC countries anticipate seeing their banking sectors develop further on average.

Table 60: Change in the Banking Sector Depth Ratios under the Convergence Scenario

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE
Bank Credit to Private Sector to GDP Ratio	25%	22%	32%	31%	34%	24%
Bank Assets to GDP Ratio	-8%	14%	23%	11%	23%	16%
Bank Liabilities To GDP Ratio	-10%	1%	10%	7%	12%	4%
Average	3%	13%	22%	16%	23%	15%

Encouraging competition in the banking sector and elevating the regulatory quality is anticipated to increase the credit to private sector to GDP ratios in the region by between 22% and 34%. The bank assets to GDP ratio is expected to increase in five out of the six Member States over the simulated period, provided that policies on inflation targeting and the rule of law—similar to those already in place in the group of 34 countries—are introduced. It is further envisaged that most of the sector development is likely to take place in Oman and Saudi Arabia whilst in Bahrain the sector's outlook appears to be less optimistic. The picture is similar when considering the efficiency, political stability and absence of violence in the region where banking sectors in Oman and Saudi Arabia are the beneficiaries.

7.4 Analysing the Effect of Converging the Determinant Factors

Despite the fact that the results of the base and convergence scenario point to a similar conclusion—i.e. that Oman and Saudi Arabia are expected to experience the highest levels of banking sectors development gains—when assessing the results of the two scenarios, the conclusions are different, as exemplified in Table 61.

Table 61: Net Effect Change of Converging the Determinant Factors on the Sector Depth

	Bahrain	Kuwait	Oman	Qatar	Saudi Arabia	UAE
Bank Credit to Private Sector to GDP Ratio	37%	46%	30%	34%	24%	26%
Bank Assets to GDP Ratio	15%	14%	14%	4%	20%	17%
Bank Liabilities To GDP Ratio	9%	4%	6%	7%	10%	4%
Average	20%	21%	16%	15%	18%	16%

The figures in the table are calculated by subtracting the expected effect of the banking sector development under the convergence scenario from that under the status quo scenario.

Table 61 provides the anticipated changes in the banking sector depth ratios due to the convergence of the determinant factors (as in the convergence scenario discussed earlier) taking into account the projected levels under the *status quo* scenario. For instance, the bank credit to private sector to GDP ratio in Kuwait is expected to drop by 24% over a ten-year period if the determinants are held constant at their last levels (see Table 59); when the determinants converge to those of the top quartile countries, the ratio is likely to improve by 22% over the same period; hence, the total effect of encouraging competition and regulatory quality in Kuwait on the banking sector depth measure is expected to amount to 46%. The results in Table 61 are thus the effect of converging the determinant factors on the banking sector development, as opposed to not doing so.

The results in Table 61 provide different conclusions from those reported in Tables 59 and 60. The results associated with the credit to private sector to GDP ratio show that Kuwait can derive most of the sector development when converging the determinants, compared to maintaining them at the current levels, while Saudi Arabia is expected to benefit the least. In contrast, Saudi Arabia and the UAE's bank assets to GDP ratios gains are anticipated to be the highest due to implementing policies that converge the determinant factors rather than not doing so. Finally, the development of the sector measured by bank liabilities to GDP ratio grow more in Saudi Arabia and Qatar under the convergence scenario as opposed to the *status quo* scenario.

Overall, all the GCC States' banking sectors are predicted to benefit from shifting the levels of the banking sector structure, macroeconomic, and governance, institutional and legal factors to those of the top quartile countries, with Kuwait and Bahrain emerging as the highest gainers. By taking no action, in the case of these latter two countries, their banking sectors are likely to be less developed a decade from now. Policies that converge the determinant factors in Kuwait and Bahrain would maintain or improve the current levels of banking sector depth according to the average results of the simulations.

8 Conclusion

This research is motivated by the significance of evaluating the banking sector depth in the GCC region. Attaining higher living standards and sustainable long-term economic growth in the region requires identifying and developing economic sectors with high potential to diversify the economic structure away from the hydrocarbon sector and contribute to the growth in the income per capita. The underdevelopment of the banking sectors in most of the Gulf countries and their role in supporting the establishment and development of other economic sectors that depend on long-term finance for their operations and growth make the banking sector a leading candidate for diversifying the Gulf economies and stimulating their long-term growth.

In addressing the research questions, this study employs the mixed effects and the system GMM for dynamic panel data models. The models and their results are utilised to determine the factors influencing the banking sector deepening in countries in which the finance-growth nexus is most manifested, to assess the status of the banking sector depth in each of the GCC Member States, and simulate the change in the levels of the banking sector development in the Gulf, given the changes in the banking structure, macroeconomic, and governance, institutional, and legal factors.

The empirical models provide significant findings. The first group of findings are associated with the determinants of the banking sector development in the top quartile

group. The research shows that in countries in which the banking sector contributes the most to long-term growth in income, banking stability, efficiency, and competition are instrumental for the sector's development. The results suggest that among the macroeconomic factors highlighted in the literature, savings and consumption levels as well as inflation are the most relevant for the sector development in the top quartile countries. In addition, assessment of the importance of the governance, institutional, and legal factors reveals that the rule of law and political stability and absence of violence are the most significant determinants for the development of the banking sector that contribute positively to growth.

Further investigation as to why certain banking sector determinant factors are crucial for the sector development in countries where banking sector deepening is effective in stimulating income growth is warranted in the future. Policymakers concerned with banking sector development should also consider the key determinants identified in this research to promote the development of a sector that accelerates long-term economic growth.

Additional evidence relates to the status of the banking sector's development in the Gulf countries. The results of the sector benchmarking, using various banking sector depth ratios, indicate consistently that the banking sectors in five out of the six GCC member countries are underdeveloped. The only exception is Bahrain, whose banking sector is found to be overdeveloped in most of the benchmarking models.

To the best of the author's knowledge this is the first study that has attempted to benchmark the banking sector's development in the GCC region. This study expands the literature concerned with the banking sector in the GCC region and poses questions related to the underdevelopment sector status in most of the region for further research. More importantly, the findings of this research challenge policymakers and regulators to take steps that would enable and encourage the development of the banking industry.

Finally, the findings associated with the simulation exercise suggest that Oman and Saudi Arabia are set to exhibit deepening in their financial sectors regardless of whether

or not policymakers opt to implement policies and regulations that converge the sector determinants with those of the top quartile countries. The simulation indicates that Bahrain and Kuwait are likely to be the beneficiaries from enhancing the banking sector stability, efficiency, and competition, as well as improving their governance, institutional, and legal settings.

The inherent diversity of the determinants highlighted in this study provides scholars with various research directions in the context of the GCC region to explore beyond the banking sector development determinants and the finance-growth nexus. The relatively lower levels of stability, efficiency, and competition, the different saving and consumption behaviour, and the inferior standards in relation to the rule of law, political stability and absence of violence, and regulatory quality, are some of the immediate areas to investigate. For the GCC States as nations, the findings are an invitation to consider the structure of the banking sector in which efficiency and competition are suboptimal, to assess the saving and consumption culture at the individual as well as the government levels, and, more importantly, to contemplate the governance, institutional, and legal settings currently in place and evaluate how their status can be enhanced in the future.

For the GCC countries to attain their goals of diversifying their economies away from the hydrocarbon industry and develop an economic structure that provides sustainable long-term economic growth, major steps are required to be undertaken. The development of the banking sector in the region is one of the initiatives that can contribute to achieving those goals and ensure that the high levels of living standards enjoyed by the people in the Gulf are maintained for the current and future generations across the region.

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APPENDICES

Appendix A – Project I

A.1 Definitions

Financial Development

Financial development "occurs when financial instruments, markets, and intermediaries ameliorate – though do not necessarily eliminate – the effects of information, enforcement, and transactions costs and therefore do a correspondingly better job at providing the five financial functions. Thus, financial development involves improvements in the (i) production of ex ante information about possible investments, (ii) monitoring of investments and implementation of corporate governance, (iii) trading, diversification, and management of risk, (iv) mobilization and pooling of savings, and (v) exchange of goods and services" (Levine, 2005, p.5).

Financial Development Measures

In the financial development literature, the level of banking sector development is measured using four characteristics of the financial system (Čihák et al., 2012). The first is the financial depth, which measures the size of the financial institutions relative to the size of the economy. Financial depth measures include private sector credit to GDP, financial institutions' assets to GDP, M2 to GDP, deposits to GDP, and gross value-added of the financial sector to GDP. The second is financial access, which is often referred to as the measure of inclusion as it is concerned with assessing the individuals' and firms' ability to access financial services in the economy. Financial access examples include the number of commercial banks' accounts per thousand adults, the number of commercial banks' branches per 100,000 adults, percentage of people with a bank account, and percentage of firms with a line of credit. The third characteristic is financial efficiency which gauges how well the banking sector is performing its role of intermediation. This is done by examining the costs passed by banks to individuals, firms, and governments. Financial efficiency indicators consist of measures such as net interest margin, lending-deposits spread, non-interest income to total income, overhead costs as a percentage of total assets, and profitability measured by ROA and ROE. The last dimension of banking development is financial stability. The latter relates to the

quality of lending, levels of liquidity, levels of capital adequacy within the banking sector. Examples of financial stability measures include z-score or distance to default, capital adequacy ratios, asset quality ratios, and liquidity ratios.

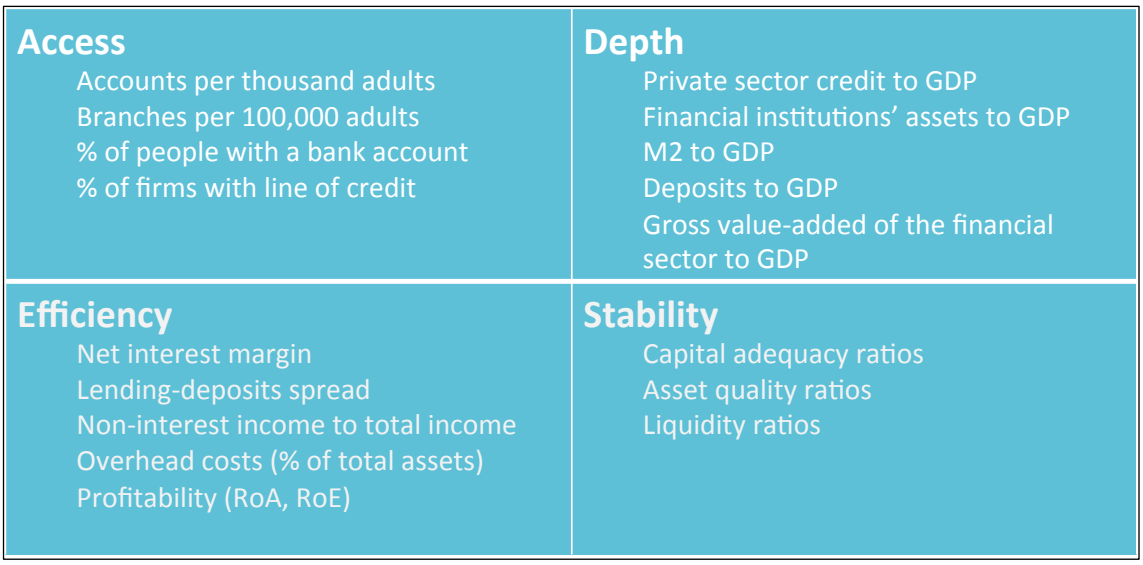

Figure A.1. Financial Development Dimensions

Source Čihák et al. (2012)

Natural Resource-Based Economies

In this research, the natural resource-based countries are those classified by the IMF as hydrocarbon- and/or mineral-rich countries. The IMF considers countries to be hydrocarbon- and/or mineral-rich if they have "(i) an average share of hydrocarbon and/or mineral fiscal revenues in total fiscal revenue of at least 25 percent… (over a five year period) or (ii) an average share of hydrocarbon and/or mineral export proceeds in total export proceeds of at least 25 percent" (IMF, 2007, p.55).

Appendix B – Project II

Table A.1: List of the NRBC Group

1	Albania	19	Guyana	37	Peru
2	Algeria	20	Indonesia	38	Qatar*
3	Angola	21	Iran, Islamic Rep.	39	Russian Federation
4	Azerbaijan	22	Iraq	40	Saudi Arabia*
5	Bahrain*	23	Kazakhstan	41	Sudan
6	Bolivia	24	Kuwait*	42	Suriname
7	Botswana	25	Lao PDR	43	Syrian Arab Republic
8	Brunei Darussalam	26	Liberia	44	Timor-Leste
9	Cameroon	27	Libya	45	Trinidad and Tobago
10	Chad	28	Mali	46	Turkmenistan
11	Chile	29	Mauritania	47	United Arab Emirates*
12	Congo, Dem. Rep.	30	Mexico	48	Uzbekistan
13	Congo, Rep.	31	Mongolia	49	Venezuela, RB
14	Cote d'Ivoire	32	Niger	50	Vietnam
15	Ecuador	33	Nigeria	51	Yemen, Rep.
16	Equatorial Guinea	34	Norway	52	Zambia
17	Gabon	35	Oman*		
18	Guinea	36	Papua New Guinea		

* Member of the GCC Countries Group

Table A.2: List of the Other Countries Group

1	Afghanistan	56	Germany	111	Northern Mariana Islands
2	American Samoa	57	Ghana	112	Pakistan
3	Andean Region	58	Greece	113	Palau
4	Andorra	59	Greenland	114	Panama
5	Antigua and Barbuda	60	Grenada	115	Paraguay
6	Argentina	61	Guam	116	Philippines
7	Armenia	62	Guatemala	117	Poland
8	Aruba	63	Guinea-Bissau	118	Portugal
9	Australia	64	Haiti	119	Puerto Rico
10	Austria	65	Honduras	120	Romania
11	Bahamas, The	66	Hong Kong SAR, China	121	Rwanda
12	Bangladesh	67	Hungary	122	Samoa
13	Barbados	68	Iceland	123	San Marino
14	Belarus	69	India	124	Sao Tome and Principe
15	Belgium	70	Ireland	125	Senegal
16	Belize	71	Isle of Man	126	Serbia
17	Benin	72	Israel	127	Seychelles
18	Bermuda	73	Italy	128	Sierra Leone
19	Bhutan	74	Jamaica	129	Singapore
20	Bosnia and Herzegovina	75	Japan	130	Sint Maarten (Dutch part)
21	Brazil	76	Jordan	131	Slovak Republic
22	Bulgaria	77	Kenya	132	Slovenia
23	Burkina Faso	78	Kiribati	133	Solomon Islands
24	Burundi	79	Korea, Dem. Rep.	134	Somalia
25	Cabo Verde	80	Korea, Rep.	135	South Africa
26	Cambodia	81	Kosovo	136	Spain
27	Canada	82	Kyrgyz Republic	137	Sri Lanka
28	Cayman Islands	83	Latvia	138	St. Kitts and Nevis
29	Central African Republic	84	Lebanon	139	St. Lucia
30	Channel Islands	85	Lesotho	140	St. Martin (French part)
31	China	86	Liechtenstein	141	St. Vincent and the Grenadines
32	Colombia	87	Lithuania	142	Swaziland
33	Comoros	88	Luxembourg	143	Sweden
34	Costa Rica	89	Macao SAR, China	144	Switzerland
35	Croatia	90	Macedonia, FYR	145	Tajikistan
36	Cuba	91	Madagascar	146	Tanzania
37	Curacao	92	Malawi	147	Thailand
38	Cyprus	93	Malaysia	148	Togo
39	Czech Republic	94	Maldives	149	Tonga
40	Denmark	95	Malta	150	Tunisia
41	Djibouti	96	Marshall Islands	151	Turkey
42	Dominica	97	Mauritius	152	Turks and Caicos Islands
43	Dominican Republic	98	Micronesia, Fed. Sts.	153	Tuvalu
44	Egypt, Arab Rep.	99	Moldova	154	Uganda
45	El Salvador	100	Monaco	155	Ukraine
46	Eritrea	101	Montenegro	156	United Kingdom
47	Estonia	102	Morocco	157	United States
48	Ethiopia	103	Mozambique	158	Uruguay
49	Faeroe Islands	104	Myanmar	159	Vanuatu
50	Fiji	105	Namibia	160	Virgin Islands (U.S.)
51	Finland	106	Nepal	161	West Bank and Gaza
52	France	107	Netherlands	162	Zimbabwe
53	French Polynesia	108	New Caledonia		
54	Gambia, The	109	New Zealand		
55	Georgia	110	Nicaragua		

Table A.3: List of the Dependent Variables with their Sources and Definitions

Variable Name	Source	Code	Definitions
GDP per capita (constant 2005 US$)	World Development Indicators, World Bank	NY.GDP.PCAP.KD	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 U.S. dollars.
GDP per capita growth (annual %)	World Development Indicators, World Bank	NY.GDP.PCAP.KD.ZG	Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by midyear population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
GNI per capita (constant 2005 US$)	World Development Indicators, World Bank	NY.GNP.PCAP.KD	GNI per capita is gross national income divided by midyear population. GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in constant 2005 U.S. dollars.
GNI per capita growth (annual %)	World Development Indicators, World Bank	NY.GNP.PCAP.KD.ZG	Annual percentage growth rate of GNI per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GNI per capita is gross national income divided by midyear population. GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.
Gross capital formation (% of GDP)	World Development Indicators, World Bank	NE.GDI.TOTL.ZS	Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.
Gross fixed capital formation, private sector (% of GDP)	World Development Indicators, World Bank	NE.GDI.FPRV.ZS	Private investment covers gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets.

Note that the variables definitions reported in the table are provided by the World Development Indicators database.

Table A.4: List of the Independent Variables with their Sources and Definitions

Variable Name	Source	Code	Definitions
Domestic credit to private sector by banks (% of GDP)	World Development Indicators	FD.AST.PRVT.GD.ZS	Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.
Assets of Deposit Banks (US$ mn) to Total GDP in Current Prices (US$ mn)	Passport Database - Euromonitor International	Not Applicable	Assets of deposit banks are all claims of deposit money banks on other sectors of economy and on non-residents. Deposit money banks comprise commercial banks and other banks that accept transferable deposits, such as demand deposits. Gross domestic product is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
Liabilities of Deposit Banks (US$ mn) to Total GDP in Current Prices (US$ mn)	Passport Database - Euromonitor International	Not Applicable	Liabilities of deposit banks include their liabilities to other sectors of economy and their own capital accounts. Deposit money banks comprise commercial banks and other banks that accept transferable deposits, such as demand deposits. Gross domestic product is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
Money and quasi money (M2) as % of GDP	World Development Indicators, World Bank	FM.LBL.MQMY.GD.ZS	Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS).
Liquid liabilities (M3) as % of GDP	World Development Indicators, World Bank	FS.LBL.LIQU.GD.ZS	Liquid liabilities are also known as M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.

Note that the variables definitions reported in the table are provided by the World Development Indicators and the Passport databases.

Table A.5: List of the Controlling Variables with their Sources and Definitions

Variable Name	Source	Code	Definitions
Foreign direct investment, net inflows (% of GDP)	World Development Indicators, World Bank	BX.KLT.DINV.WD.GD.ZS	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.
General government final consumption expenditure (% of GDP)	World Development Indicators, World Bank	NE.CON.GOVT.ZS	General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.
Inflation, consumer prices (annual %)	World Development Indicators, World Bank	FP.CPI.TOTL.ZG	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.
School enrollment, secondary (% gross)	World Development Indicators, World Bank	SE.SEC.ENRR	Gross enrollment ratio. Secondary. All programmes. Total is the total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age. GER can exceed 100% due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition.
Trade (% of GDP)	World Development Indicators, World Bank	NE.TRD.GNFS.ZS	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

Note that the variables definitions reported in the table are provided by the World Development Indicators database.

Table A.62: Credit to Private Sector & Real GDP per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Country Group	Natural Resource-Based Countries					Other Countries					Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita					Real GDP per Capita					Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																		
1st Lag of Initial Real GDP per Capita	1.079***	0.9475***	0.9888***	0.8509***	0.8688***	0.9165***	0.9586***	0.925***	0.8763***	0.8598***	0.183	-2.1715	-1.3808	-0.093	-0.6389	-0.5426	-1.215	-2.1833
	(0.095)	(0.111)	(0.107)	(0.118)	(0.085)	(0.05)	(0.052)	(0.054)	(0.051)	(0.063)	(1.075)	(1.651)	(1.706)	(1.869)	(1.132)	(1.123)	(0.894)	(1.382)
Credit to Private Sector to GDP Ratio	0.281		0.09312	0.0935	0.0914	0.1896**		0.2261***	0.1162		-0.3157	1.4998	1.7158		1.3487		2.6294	
	(0.263)		(0.072)	(0.125)	(0.100)	(0.092)		(0.077)	(0.041)		(2.973)	(1.743)	(1.785)		(2.056)		(2.075)	
1st Lag of Credit to Private Sector to GDP Ratio	-0.3137	0.2171**		-0.0696		-0.138		-			1.3815		-1.1727	-1.6675	-1.6027		-3.1634	
	(0.262)	(0.091)		(0.14)		(0.12)		0.2283***			(3.813)		(1.906)	(1.413)	(2.277)		(2.107)	
2nd Lag of Credit to Private Sector to GDP Ratio	0.1377	-0.1878*		-0.0065		0.0354	0.07**	0.066**		0.1149**	-0.3294		0.143		1.0686	1.1163	1.9414**	1.3316
	(0.089)	(0.101)		(0.075)		(0.048)	(0.034)	(0.034)		(0.055)	(1.99)		(1.382)		(0.751)	(0.842)	(0.946)	(1.027)
3rd Lag of Credit to Private Sector to GDP Ratio	-0.0608			-0.0037		0.0023		-0.0247			-0.8538		0.1577		-0.3132		-0.5501	
	(0.055)			(0.058)		(0.026)		(0.022)			(1.31)		(0.916)		(0.61)		(0.422)	
1st Lag of Gross Secondary School Enrolment Rate	0.1333	0.2947	0.0758	0.1381	0.0418	0.1185	0.0482	0.0849	0.1742	0.1302	2.0059	2.5686	1.9422	-1.4367	1.796	0.7228	2.3481*	2.2591
	(0.139)	(0.237)	(0.096)	(0.126)	(0.154)	(0.08)	(0.089)	(0.059)	(0.11)	(0.094)	(2.314)	(1.982)	(1.507)	(2.691)	(2.267)	(2.05)	(1.329)	(1.78)
1st Lag of Inflation Rate				-0.1393	-0.1403			-0.1911	-0.1955**	-0.1604			-2.0938**	-1.3032			-2.666	1.6019
				(0.18)	(0.126)			(0.182)	(0.079)	(0.107)			(0.853)	(1.108)			(2.871)	(2.433)
1st Lag of Government Consumption to GDP Ratio				0.1082	0.0332			0.078	-0.0301	0.0551			0.3073	2.1603			1.3733	1.9089
				(0.158)	(0.182)			(0.077)	(0.078)	(0.109)			(2.491)	(3.431)			(1.193)	(1.442)
1st Lag of FDI to GDP Ratio				-0.0075	-0.0077			0.019	0.028	0.0717**			-0.539	1.0406			0.1489	0.4604
				(0.035)	(0.026)			(0.028)	(0.025)	(0.032)			(0.429)	(0.788)			(0.335)	(0.551)
1st Lag of Trade to GDP Ratio				0.4048**	0.3863**			0.1026	0.0932	0.1823			1.7085	3.3656			-0.8444	2.3317
				(0.188)	(0.175)			(0.076)	(0.097)	(0.111)			(2.728)	(3.702)			(1.414)	(1.544)
Constant	-1.0963	-0.6171	-0.2941	-1.2849*	-1.1008	-0.0663	-0.2638	-0.4245	-0.3293	-0.6644	-6.8297	4.6419	-4.9918	-9.012	-2.7926	-2.1777	-1.278	-10.3349*
	(0.801)	(0.6)	(0.88)	(0.751)	(1.09)	(0.213)	(0.499)	(0.325)	(0.408)	(0.541)	(8.849)	(10.863)	(11.825)	(16.871)	(3.431)	(7.914)	(5.32)	(5.672)
Observations	178	193	228	131	153	421	456	369	399	392	178	228	131	152	421	456	369	392
Groups	44	45	46	39	42	100	101	93	96	95	44	46	39	42	100	101	93	95
Instruments	34	31	32	33	41	35	31	65	62	60	34	32	33	41	35	31	65	60
AR(1)	-0.92	0.04	-0.19	-1.31	-1.51	-1.9	-2.38	-1.94	-2.07	-2.22	-1.18	-1.42	-1.59	-1.74	-3.06	-3.13	-2.97	-3.23
AR(1) p-value	0.359	0.969	0.848	0.19	0.131	0.058	0.017	0.052	0.039	0.027	0.237	0.154	0.113	0.082	0.002	0.002	0.003	0.001
AR(2)	-0.03	-0.78	-2.02	-0.67	-0.92	-1.81	-2.66	-1.69	-2.61	-2.95	0.09	0.31	0.4	-0.07	1.1	0.52	1.97	0.67
AR(2) p-value	0.975	0.433	0.044	0.505	0.357	0.07	0.008	0.091	0.009	0.003	0.927	0.756	0.689	0.94	0.269	0.606	0.049	0.505
Sargan Overidentification Test	27.69	44.91	61.18	35.47	46.75	55.29	38.38	156.11	135.97	168.28	12.97	28.34	33.05	53.27	45.55	37.24	104.57	118.86
Sargan p-value	0.186	0.002	0	0.005	0.015	0	0.008	0	0	0	0.934	0.165	0.011	0.003	0.002	0.011	0	0
Hansen Overidentification Test	19.59	18.81	23.94	20.84	25.67	23.58	18.39	61.35	62.19	55.93	22.27	19.37	17.05	31.77	29.73	27.46	55.77	51.79
Hansen p-value	0.609	0.598	0.35	0.234	0.591	0.37	0.562	0.111	0.098	0.175	0.444	0.622	0.451	0.284	0.125	0.123	0.235	0.292

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.7: Bank Assets to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries				
Dependent Variable	Real GDP per Capita				Real GDP per Capita				Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate				
Independent Variables																	
1st Lag of Initial Real GDP per Capita	0.9611***	0.8796***	0.8901***	0.9124***	0.9101***	0.9707***	0.8702***	0.8717***	-2.2084	-1.7097	-2.4487	-2.0931	-0.4178	-0.1752	-1.3041	-	-1.7778**
	(0.102)	(0.108)	(0.112)	(0.102)	(0.079)	(0.053)	(0.048)	(0.06)	(2.28)	(2.23)	(2.02)	(2.216)	(1.421)	(0.997)	(1.156)	1.9518***	(0.794)
Bank Assets to GDP Ratio	0.0839		0.0296		-0.0674		-0.0336		-3.5559		-1.2239		-0.2218	1.5269***		-0.4611	
	(0.146)		(0.144)		(0.043)		(0.037)		(3.381)		(3.999)		(0.99)	(0.491)		(0.861)	
1st Lag of Bank Assets to GDP Ratio	-0.1323		-0.0766	-0.0851	0.1345**		0.0826*		4.0219		1.4296	-1.6698*	0.6247			1.1273	
	(0.136)		(0.12)	(0.052)	(0.054)		(0.044)		(2.68)		(4.391)	(0.965)	(0.965)			(1.01)	
2nd Lag of Bank Assets to GDP Ratio	0.0203		-0.0866		-0.0141	0.059**	0.0069	0.0521**	-1.4173		-1.4445		0.1717		0.9053**	0.0552	
	(0.086)		(0.102)		(0.019)	(0.023)	(0.027)	(0.026)	(1.2)		(0.87)		(0.48)		(0.407)	(0.477)	
3rd Lag of Bank Assets to GDP Ratio	0.0269	0.2953**	0.0511		0.0186		0.0335		1.07	4.9679*	0.9149		-0.0885			0.3233	0.728**
	(0.036)	(0.117)	(0.059)		(0.017)		(0.021)		(0.957)	(2.86)	(0.924)		(0.342)			(0.32)	(0.366)
1st Lag of Gross Secondary School Enrolment Rate	0.1246	0.1456	0.3358*	0.0382	0.1506	0.0665	0.2352**	0.1656*	0.8013	-1.3631	2.0466	-0.3378	1.0017	0.6169	2.468	3.6287***	2.9961**
	(0.167)	(0.172)	(0.177)	(0.162)	(0.157)	(0.093)	(0.094)	(0.1)	(2.515)	(3.413)	(1.361)	(2.074)	(2.346)	(1.716)	(2.133)	(1.233)	(1.299)
1st Lag of Inflation Rate			0.0458	-0.1314			0.1566	-0.1076			-0.4334	-0.76				1.101	2.0243
			(0.143)	(0.139)			(0.198)	(0.085)			(3.822)	(1.371)				(2.72)	(2.824)
1st Lag of Government Consumption to GDP Ratio			0.3183	0.2011			0.0226	0.1147			2.1209	4.8785				0.0443	0.3016
			(0.245)	(0.155)			(0.081)	(0.123)			(5.258)	(3.868)				(1.211)	(0.903)
1st Lag of FDI to GDP Ratio			0.0057	0.0153			0.0334	0.0493			-0.9077	0.4645				0.124	0.4022
			(0.063)	(0.028)			(0.027)	(0.032)			(0.595)	(0.567)				(0.419)	(0.441)
1st Lag of Trade to GDP Ratio			0.2464	0.4282**			0.1304	0.1659			2.2156	3.8558				-0.742	-0.4904
			(0.293)	(0.182)			(0.1)	(0.14)			(3.233)	(3.063)				(1.469)	(1.358)
Constant	-0.1264	0.4078	-2.0176	-1.7665*	0.1419	0.0226	-0.5815	-0.6676	17.6153	17.3786	-1.2608	-12.5448	-0.2265	-2.6128	0.2721	3.8548	3.5884
	(0.469)	(0.917)	(1.835)	(0.98)	(0.225)	(0.236)	(0.519)	(0.588)	(14.521)	(16.53)	(37.263)	(26.774)	(3.95)	(3.845)	(3.233)	(6.832)	(5.62)
Observations	116	116	92	144	274	350	246	303	116	116	92	144	274	420	350	246	246
Groups	41	41	36	40	88	92	82	86	41	41	36	40	88	93	92	82	82
Instruments	29	23	31	34	29	25	60	56	29	23	31	34	29	29	25	60	54
AR(1)	-1	-0.63	-1.02	-1.26	-1.87	-2.51	-1.35	-2.21	-1.95	-1.3	-1.85	-2.02	-2.93	-2.82	-3.14	-2.43	-2.76
AR(1) p-value	0.317	0.528	0.309	0.209	0.062	0.012	0.176	0.027	0.051	0.193	0.064	0.044	0.003	0.005	0.002	0.015	0.006
AR(2)	-1.58	-0.85	-0.72	-0.68	-2.03	-2	-2.2	-2.57	1.62	-0.09	0.64	0.16	-1.16	-1.43	-1.24	-0.95	-0.85
AR(2) p-value	0.114	0.395	0.469	0.499	0.043	0.046	0.028	0.01	0.106	0.926	0.522	0.873	0.245	0.151	0.215	0.341	0.394
Sargan Overidentification Test	70.01	21.03	44.75	30.69	39.29	24.57	124.21	113.43	28.52	19.69	26.69	45.98	51.6	20.79	32.7	102.44	98.17
Sargan p-value	0	0.177	0	0.079	0.004	0.105	0	0	0.074	0.235	0.063	0.001	0	0.348	0.012	0	0
Hansen Overidentification Test	17.07	6.14	23.43	24.61	20.34	19.09	48.17	53.78	20.23	14.99	15.57	19.4	32.51	19.45	24.85	49.13	49.17
Hansen p-value	0.585	0.987	0.136	0.265	0.374	0.323	0.385	0.148	0.381	0.525	0.555	0.56	0.027	0.428	0.098	0.349	0.24

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.8: Bank Liabilities to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita				Real GDP per Capita				Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.9345***	0.9364***	0.8124***	0.9502***	0.9751***	0.8323***	0.9104***	0.8421***	-1.2201	-0.6161	-2.6848	-2.062	-1.1574	0.6895	-1.2783	-2.3655*
	(0.079)	(0.138)	(0.123)	(0.076)	(0.062)	(0.097)	(0.063)	(0.081)	(1.579)	(1.169)	(1.678)	(1.565)	(1.496)	(2.113)	(0.982)	(1.302)
Bank Liabilities to GDP Ratio	0.1093		0.0724		0.0925*		0.0077		1.0494	0.9292	1.386	1.6795**	1.4528***		-0.2854	
	(0.082)		(0.11)		(0.048)		(0.042)		(2.4)	(0.827)	(1.6)	(0.702)	(0.557)		(0.709)	
1st Lag of Bank Liabilities to GDP Ratio	-0.1112		-0.0067	0.1042*	-0.0516	0.1319**	-0.058*		0.8939		0.8002		-1.1263**		-0.6109	
	(0.091)		(0.05)	(0.056)	(0.04)	(0.06)	(0.033)		(1.455)		(1.369)		(0.495)		(0.605)	
2nd Lag of Bank Liabilities to GDP Ratio	0.0036		0.0212		0.0059		0.016		-0.2216		-0.1126		-0.0165		0.3399	0.5024
	(0.069)		(0.063)		(0.018)		(0.023)		(1.387)		(0.963)		(0.357)		(0.406)	(0.562)
3rd Lag of Bank Liabilities to GDP Ratio	-0.0521	0.0452	-0.0082		0.0034		-0.0213	-0.0259	0.6159		0.3659		0.1204	-1.4314	-0.4707	
	(0.067)	(0.048)	(0.059)		(0.016)		(0.016)	(0.027)	(0.788)		(0.74)		(0.275)	(0.96)	(0.292)	
1st Lag of Gross Secondary School Enrolment Rate	0.2287	-0.0225	0.3372	-0.0251	0.0328	0.1724*	0.3124***	0.3188***	-0.226	0.694	0.4992	-0.3521	2.0783	1.0243	3.8275**	3.2456*
	(0.212)	(0.252)	(0.302)	(0.119)	(0.105)	(0.098)	(0.109)	(0.109)	(2.895)	(2.483)	(2.643)	(2.773)	(2.176)	(4.723)	(1.927)	(1.795)
1st Lag of Inflation Rate			-0.0997	-0.1368			-0.047	0.0158			-2.898	-0.9661			-2.3843	2.6272*
			(0.169)	(0.085)			(0.154)	(0.176)			(3.871)	(0.891)			(2.13)	(1.506)
1st Lag of Government Consumption to GDP Ratio			-0.0027	0.1114			0.0714	0.0923			-1.831	0.7326			1.3962	0.9745
			(0.11)	(0.159)			(0.077)	(0.094)			(3.742)	(3.31)			(1.259)	(1.886)
1st Lag of FDI to GDP Ratio			-0.0194	0.0224			0.0397*	0.0275			-0.6044	0.5652			0.7195**	0.5782
			(0.045)	(0.039)			(0.021)	(0.026)			(0.892)	(1.101)			(0.352)	(0.72)
1st Lag of Trade to GDP Ratio			0.3037*	0.3936			-0.0207	0.0209			0.661	3.8314			-1.8603	2.1019
			(0.161)	(0.261)			(0.085)	(0.088)			(3.576)	(3.823)			(1.245)	(1.303)
Constant	-0.0974	0.5424	-0.9422	-1.6156	0.1485	0.5809	-0.3896	-0.0874	9.5938	0.8362	20.0394	-2.499	1.5126	-4.8869	2.1836	-6.0798
	(0.766)	(0.722)	(0.944)	(1.226)	(0.344)	(0.397)	(0.45)	(0.523)	(11.307)	(11.929)	(24.222)	(18.572)	(6.257)	(4.791)	(5.188)	(7.55)
Observations	110	110	88	139	256	399	230	232	110	193	88	141	256	260	230	291
Groups	39	39	34	39	83	93	77	78	39	43	34	39	83	84	77	86
Instruments	29	23	31	34	29	27	60	54	29	28	31	34	29	23	60	56
AR(1)	-1.08	-0.7	-0.29	-1.02	-1.5	-1.53	-1.44	-1.31	-1.59	-1.4	-1.89	-2.04	-2.76	-2.67	-2.31	-2.65
AR(1) p-value	0.281	0.486	0.77	0.31	0.134	0.127	0.151	0.189	0.112	0.162	0.058	0.041	0.006	0.008	0.021	0.008
AR(2)	-1.29	-0.99	-0.57	-1.36	-1.7	-3.02	-1.61	-1.77	0.55	0.38	0.65	0.31	-0.8	-1.24	-0.74	-0.3
AR(2) p-value	0.198	0.323	0.572	0.175	0.089	0.003	0.107	0.076	0.583	0.704	0.515	0.756	0.426	0.215	0.46	0.763
Sargan Overidentification Test	44.63	64.54	35.62	25.13	34.86	15.98	122.23	138.39	38.63	25.05	24.95	41.21	35.02	26.77	91.55	78.61
Sargan p-value	0.001	0	0.005	0.242	0.015	0.594	0	0	0.005	0.159	0.096	0.005	0.014	0.044	0	0.001
Hansen Overidentification Test	26.15	16.8	15.24	19.91	24.51	12.81	50.14	52.18	16.94	16.56	18.84	17.18	28.75	24.18	52.91	47.09
Hansen p-value	0.126	0.399	0.578	0.527	0.177	0.803	0.313	0.159	0.594	0.62	0.338	0.7	0.07	0.086	0.225	0.347

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.9: Money Supply to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68
Country Group	Natural Resource-Based Countries				Other Countries					Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita				Real GDP per Capita					Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																	
1st Lag of Initial Real GDP per Capita	0.9775***	1.0047***	0.8947***	0.8573***	0.9057***	0.9298***	0.9071***	0.8545***	0.8253***	-0.3251	-1.5947	-2.0743	-0.5854	-1.1003	-1.5008	-1.6185*	-2.2095*
	(0.088)	(0.075)	(0.073)	(0.134)	(0.038)	(0.043)	(0.059)	(0.06)	(0.065)	(0.956)	(1.402)	(1.666)	(1.425)	(0.751)	(1.159)	(0.885)	(1.302)
Money Supply to GDP Ratio	0.0687	0.0944	0.0471		0.4054***	0.3878***		0.143		-4.822	-1.9895	2.4043		4.956**		0.5112	
	(0.106)	(0.139)	(0.34)		(0.118)	(0.115)		(0.098)		(2.944)	(3.137)	(2.926)		(2.45)		(2.182)	
1st Lag of Money Supply to GDP Ratio	-0.1736		-0.1398		-0.3345**	-0.3015**		-0.1513		6.1088**		-5.0352	-2.8869	-4.4123		-0.2111	
	(0.148)		(0.292)		(0.134)	(0.12)		(0.11)		(2.525)		(4.334)	(2.572)	(2.749)		(2.186)	
2nd Lag of Money Supply to GDP Ratio	0.1437*		0.0868	-0.1268	0.1197**	0.0985**	0.1482***	0.1237***	0.232***	-1.1105		3.5146		2.2807*	3.1648***	1.0074	3.0299**
	(0.077)		(0.121)	(0.152)	(0.05)	(0.043)	(0.057)	(0.047)	(0.071)	(1.677)		(2.677)		(1.301)	(1.155)	(0.759)	(1.371)
3rd Lag of Money Supply to GDP Ratio	-0.0863		-0.1242		0.0168			-0.0029		-1.0485		-3.8867		0.6322		0.4053	
	(0.101)		(0.151)		(0.032)			(0.043)		(0.959)		(2.782)		(0.668)		(0.796)	
1st Lag of Gross Secondary School Enrolment Rate	0.3397*	0.0483	0.1706	0.1645	0.0943	0.0646	0.1406	0.19*	0.2125**	2.7576	1.5276	2.3593*	-2.0348	1.4256	2.5003	3.0137*	3.6341*
	(0.199)	(0.117)	(0.118)	(0.113)	(0.076)	(0.076)	(0.105)	(0.098)	(0.1)	(3.098)	(2.831)	(1.277)	(3.161)	(1.375)	(2.17)	(1.57)	(1.892)
1st Lag of Inflation Rate			-0.1402	-0.0775				-0.1308	-0.3356**			-1.7513	-0.8398			0.3277	-0.4888
			(0.199)	(0.08)				(0.183)	(0.155)			(1.842)	(1.036)			(2.487)	(2.002)
1st Lag of Government Consumption to GDP Ratio			0.0844	0.1533				0.0173	-0.0039			2.5175	3.5354			1.2014	1.5335
			(0.255)	(0.205)				(0.111)	(0.11)			(3.152)	(3.739)			(1.622)	(1.899)
1st Lag of FDI to GDP Ratio			-0.0039	0.0125				0.0197	0.0295			-0.3437	0.3497			0.0225	-0.3873
			(0.047)	(0.036)				(0.031)	(0.037)			(0.635)	(0.922)			(0.447)	(0.683)
1st Lag of Trade to GDP Ratio			0.4884***	0.5113**				0.1442	0.2109			4.653	6.789*			0.5563	2.9389*
			(0.169)	(0.251)				(0.098)	(0.138)			(3.463)	(3.766)			(1.004)	(1.637)
Constant	-0.6472	-0.5219	-1.5592	-1.5457	-0.2991*	-0.3049	0.0268	-0.5593	-1.0827*	-2.8913	14.0937	-7.9941	-18.3927	-	-5.302	-9.4037	-
	(0.685)	(0.619)	(0.957)	(1.046)	(0.181)	(0.206)	(0.642)	(0.543)	(0.643)	(17.38)	(17.757)	(10.049)	(20.657)	8.8142***	(10.362)	(6.99)	23.3666**
Observations	180	228	133	145	395	432	436	347	375	180	228	133	152	395	436	347	375
Groups	44	46	39	41	95	101	101	88	95	44	46	39	42	95	101	88	95
Instruments	34	32	33	41	35	35	31	65	60	34	32	33	41	35	31	65	60
AR(1)	0.57	-0.09	-0.81	-1.56	-2.59	-2.55	-2.16	-1.72	-1.76	-1.79	-1.47	-1.61	-2.14	-3.13	-3.55	-3.19	-3.47
AR(1) p-value	0.568	0.932	0.419	0.119	0.01	0.011	0.031	0.086	0.079	0.073	0.142	0.107	0.032	0.002	0	0.001	0.001
AR(2)	-0.53	-2.32	-1.08	-0.78	-1.17	-1.6	-2.71	-1.54	-1.92	-0.94	0.55	0.41	0.01	0.35	1.06	0.92	0.69
AR(2) p-value	0.597	0.02	0.281	0.436	0.243	0.11	0.007	0.124	0.055	0.349	0.585	0.685	0.994	0.725	0.291	0.358	0.489
Sargan Overidentification Test	39.99	60.92	39.08	38.01	32.23	30.52	23.83	165.65	138.2	24.02	33.04	35.49	61.73	28.06	21.5	102.44	88.88
Sargan p-value	0.011	0	0.002	0.098	0.074	0.106	0.25	0	0	0.346	0.061	0.005	0	0.174	0.368	0	0
Hansen Overidentification Test	18.64	23.65	20.62	30.92	16.22	17.38	17.85	60.42	54.17	19.61	22.78	23.15	27.78	27.49	22.01	49.76	50.61
Hansen p-value	0.667	0.366	0.244	0.321	0.805	0.742	0.597	0.127	0.22	0.607	0.414	0.144	0.476	0.193	0.34	0.443	0.333

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.10: Broad Money Supply to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries				
Dependent Variable	Real GDP per Capita				Real GDP per Capita				Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate				
Independent Variables																	
1st Lag of Initial Real GDP per Capita	1.0557***	1.1225***	0.4755	1.0813**	1.1035***	0.9717***	1.0338***	1.0151***	0.8929	2.7677	-59.6584	5.7412	1.834**	-0.0311	0.1511	-0.0664	-0.2287
	(0.088)	(0.206)	(0.42)	(0.46)	(0.061)	(0.108)	(0.062)	(0.069)	(1.973)	(3.738)	(40.551)	(8)	(0.796)	(2.142)	(0.753)	(1.125)	(1.138)
Broad Money Supply to GDP Ratio	0.2602		0.3531	0.2245	0.115		0.0066		1.1309		46.331		-0.7881		0.3479		
	(0.242)		(0.284)	(0.43)	(0.085)		(0.151)		(5.307)		(35.113)		(1.596)		(3.314)		
1st Lag of Broad Money Supply to GDP Ratio	-0.0749	0.4949**	-0.3055		0.0308		0.0718		4.9586		-112.5827		3.8932**		1.49		3.24*
	(0.242)	(0.202)	(0.599)		(0.129)		(0.164)		(5.358)		(82.146)		(1.633)		(2.902)		(1.712)
2nd Lag of Broad Money Supply to GDP Ratio						0.2031		0.2849**		4.5039		8.7853***		3.7339		6.9298***	
						(0.132)		(0.134)		(4.328)		(2.657)		(2.664)		(2.441)	
3rd Lag of Broad Money Supply to GDP Ratio																	
1st Lag of Gross Secondary School Enrolment Rate	-0.091	-0.3248	0.6008	-0.1067	-0.0902	0.077	0.0327	-0.0759	-3.0727	-1.7543	63.3788	-11.035	-3.2052**	-0.6579	0.6357	-1.8248	0.562
	(0.144)	(0.221)	(0.489)	(0.527)	(0.095)	(0.182)	(0.123)	(0.129)	(3.823)	(5.935)	(41.611)	(8.126)	(1.607)	(5.823)	(1.323)	(1.635)	(1.206)
1st Lag of Inflation Rate			0.0498	0.0084			-0.3103	-0.0448			41.7955	1.3364			0.4584	3.0724	-2.1519
			(0.274)	(0.215)			(0.462)	(0.253)			(31.719)	(5.06)			(3.142)	(3.495)	(6.264)
1st Lag of Government Consumption to GDP Ratio			-1.4064*	0.0996			-0.0981	-0.0364			-69.877*	-5.8791			-1.4729	-1.3977	-0.3805
			(0.757)	(0.655)			(0.128)	(0.173)			(37.012)	(6.379)			(1.893)	(2.51)	(2.692)
1st Lag of FDI to GDP Ratio			0.017	0.0842			0.0362	-0.0062			10.171	()			0.0726	0.1844	-0.1777
			(0.058)	(0.18)			(0.033)	(0.041)			(7.777)				(0.45)	(0.835)	(0.606)
1st Lag of Trade to GDP Ratio			-0.6225	0.0788			-0.1275	-0.1359			59.3575	6.4443			-2.0431	-4.4655	-5.4401
			(0.507)	(0.219)			(0.12)	(0.143)			(52.327)	(13.072)			(1.579)	(2.875)	(3.869)
Constant	-1.1433	-1.9893	7.7098	-1.9442	-	-0.5125	0.3065	-0.0153	-21.435	-29.13	377.1029	-43.0211	-13.7756***	-8.8436	3.9207	6.4056	14.6869
	(0.791)	(1.744)	(5.103)	(5.709)	0.9669***	(0.341)	(0.442)	(0.379)	(12.344)	(30.655)	(212.936)	(85.994)	(5.059)	(5.874)	(5.043)	(8.181)	(13.21)
Observations	68	79	42	50	169	174	127	145	68	69	42	50	169	174	127	145	147
Groups	19	26	14	18	51	47	45	42	19	21	14	17	51	47	45	42	47
Instruments	18	19	29	27	35	31	43	34	18	21	29	27	35	31	43	41	41
AR(1)	-1.12	-0.93	-0.21	-0.2	-1.8	-1.06	-1.43	-1.26	-1.67	-1.62	-2.5	-3.28	-1.86	-1.86	-1.37	-1.34	-1.29
AR(1) p-value	0.262	0.351	0.832	0.844	0.072	0.289	0.153	0.208	0.095	0.106	0.012	0.001	0.063	0.062	0.169	0.18	0.196
AR(2)	0.44	0.33	-1.97	-0.3	-1.6	-0.24	-0.06	0.31	0.09	0.64		1.2	-0.99	0.08	0.28	0.88	0.75
AR(2) p-value	0.66	0.743	0.049	0.766	0.109	0.809	0.952	0.758	0.925	0.523		0.229	0.321	0.939	0.78	0.38	0.452
Sargan Overidentification Test	6.26	34.27	23.24	38.02	42.37	78.77	83.91	86.77	6.13	16.64	18.11	42.58	37.65	47.78	50.57	46.97	56.67
Sargan p-value	0.51	0	0.079	0.001	0.006	0	0	0	0.525	0.164	0.257	0	0.02	0	0.008	0.014	0.001
Hansen Overidentification Test	6.2	10.62	0	6.55	22.98	18.36	26.46	20.03	5.4	15.08	0	3.54	20.35	21.94	28.1	28.59	29.5
Hansen p-value	0.517	0.302	1	0.951	0.403	0.564	0.601	0.52	0.611	0.237	1	0.998	0.561	0.344	0.512	0.433	0.387

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.11: Credit to Private Sector to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104
Country Group	Natural Resource-Based Countries				Other Countries							Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita							Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																			
1st Lag of Initial Real GNI per Capita	0.8893***	0.8829***	0.7295***	0.6653***	0.7697***	0.8616***	0.9449***	0.779***	0.9533***	0.9382***	0.9027***	-0.9723	-2.6131	-7.4828	2.9675	-5.1093**	-	-2.7153**	-
	(0.073)	(0.14)	(0.172)	(0.13)	(0.101)	(0.079)	(0.068)	(0.092)	(0.052)	(0.046)	(0.073)	(4.199)	(3.369)	(5.619)	(9.919)	(2.278)	5.5953***	(1.084)	2.9105***
Credit to Private Sector to GDP Ratio	0.2651***	0.2339**	0.2353**	0.108	0.1671	0.2687***	0.2729***		0.1687**	0.1557***		-7.6498		-4.3193	-4.030	-1.515		1.2439	
	(0.053)	(0.104)	(0.09)	(0.082)	(0.117)	(0.068)	(0.076)		(0.071)	(0.052)		(13.917)		(6.459)	(5.232)	(3.208)		(1.434)	
1st Lag of Credit to Private Sector to GDP Ratio	-0.2106**		-0.1166		-0.0993	-	-0.1749**		-0.169***	-		8.6365	3.0571	4.1026		2.2817		-0.845	
	(0.079)		(0.15)		(0.136)	0.1753***	(0.074)		(0.06)	0.1411***		(14.997)	(2.893)	(6.223)		(3.033)		(1.565)	
2nd Lag of Credit to Private Sector to GDP Ratio	0.0672		0.0649		0.0789	0.08**		0.1478***	0.0511	0.0629*	0.0957	-0.6668		0.9068		1.0521	3.2581***	1.2283	2.1115**
	(0.05)		(0.097)		(0.056)	(0.04)		(0.048)	(0.042)	(0.036)	(0.059)	(4.787)		(4.411)		(1.06)	(1.169)	(0.817)	(0.934)
3rd Lag of Credit to Private Sector to GDP Ratio	-0.0514		-0.0481		0.0017				-0.0233			-4.0671		-0.0813		0.6182		0.0327	
	(0.043)		(0.123)		(0.036)				(0.029)			(4.499)		(3.364)		(0.726)		(0.491)	
1st Lag of Gross Secondary School Enrolment Rate	0.3324**	-0.0819	0.2387	0.4215*	0.3718**	0.1664	0.0586	0.3647**	0.0917	0.0609	0.0747	0.9595	-2.3667	8.4647	4.0204	8.6776**	9.096***	4.2756**	3.7314**
	(0.126)	(0.355)	(0.161)	(0.231)	(0.174)	(0.118)	(0.115)	(0.17)	(0.068)	(0.063)	(0.1)	(5.039)	(7.837)	(7.239)	(15.025)	(3.351)	(3.361)	(1.748)	(1.558)
1st Lag of Inflation Rate			-0.0118	-0.0774					0.0038	-0.1956	-0.1571			-3.6426	-2.9679			3.4801	3.7459**
			(0.087)	(0.118)					(0.109)	(0.156)	(0.106)			(9.909)	(3.663)			(5.385)	(1.568)
1st Lag of Government Consumption to GDP Ratio			-0.0028	-0.1474					0.0189	0.0076	0.1395			4.9965	-5.3842			2.611	4.0922*
			(0.282)	(0.221)					(0.099)	(0.098)	(0.163)			(13.927)	(9.923)			(2.207)	(2.443)
1st Lag of FDI to GDP Ratio			-0.0157	-0.0062					0.0134	0.0225	0.0469			0.6707	0.767			0.0152	0.512
			(0.049)	(0.038)					(0.027)	(0.026)	(0.029)			(1.596)	(2.688)			(0.708)	(0.578)
1st Lag of Trade to GDP Ratio			0.6913**	0.5711***					0.1404*	0.2127***	0.2239***			1.964	-8.4871			-0.0857	1.2752
			(0.297)	(0.187)					(0.075)	(0.075)	(0.079)			(16.347)	(18.01)			(1.263)	(1.647)
Constant	-0.509	0.4542	-1.746**	-1.3265	0.0139	0.1614	0.5056	0.0596	-0.5906	-0.7358**	-0.9697**	18.4142	17.5599*	10.7012	24.9076	3.896	5.0946	-4.0802	-
	(0.574)	(0.805)	(0.824)	(1.047)	(0.27)	(0.401)	(0.6)	(0.555)	(0.39)	(0.331)	(0.391)	(25.127)	(10.24)	(42.807)	(95.878)	(6.845)	(10.466)	(5.263)	11.1246**
Observations	122	146	97	110	317	333	362	337	287	297	301	122	146	97	110	317	337	287	301
Groups	30	31	27	29	80	81	81	81	76	77	77	30	31	27	29	80	81	76	77
Instruments	30	28	33	27	35	35	35	31	65	64	60	30	31	33	27	35	31	65	60
AR(1)	-0.96	-0.76	-0.58	-0.07	-1.42	-2.26	-2.32	-1.84	-1.9	-2.18	-1.98	-1.02	-0.93	-0.83	-1.54	-2.48	-2.83	-2.64	-2.81
AR(1) p-value	0.335	0.445	0.564	0.941	0.156	0.024	0.02	0.066	0.058	0.029	0.047	0.306	0.353	0.409	0.124	0.013	0.005	0.008	0.005
AR(2)	0.08	-1.23	0.84	-0.15	-1.8	-1.83	-2.22	-2.63	-2.02	-2.02	-2.07	-0.68	0.56	-0.17	1.22	0.22	0.81	1.54	1.67
AR(2) p-value	0.938	0.22	0.4	0.88	0.072	0.067	0.027	0.009	0.044	0.044	0.038	0.493	0.576	0.862	0.221	0.824	0.42	0.124	0.094
Sargan Overidentification Test	21.57	48.82	23.51	33.31	65.22	61.4	62.79	65.22	144.15	145.36	125.08	23.09	27.94	21.22	7.55	33.62	37.43	84.85	89.17
Sargan p-value	0.252	0	0.134	0.003	0	0	0	0	0	0	0	0.187	0.142	0.217	0.911	0.054	0.01	0.001	0
Hansen Overidentification Test	10.47	18.54	13.33	16.87	25.67	29.09	29.88	27.86	61.63	60.27	50.49	15.77	20.63	7.19	3.87	20.36	17.67	46.98	48.8
Hansen p-value	0.915	0.421	0.714	0.263	0.266	0.142	0.121	0.113	0.106	0.13	0.337	0.608	0.481	0.981	0.996	0.561	0.609	0.555	0.401

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.12: Bank Assets to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GNI per Capita	0.8609***	0.9331***	1.0019***	0.6707***	1.0202***	1.0944***	0.9539***	0.9774***	-4.244	-5.3129	-7.1329	-4.2515	-1.0609	-1.1271	-1.3994	-2.4937
	(0.12)	(0.1)	(0.135)	(0.132)	(0.103)	(0.075)	(0.095)	(0.072)	(2.902)	(9.914)	(7.688)	(10.591)	(1.641)	(1.614)	(1.219)	(2.269)
Bank Assets to GDP Ratio	-0.0286		0.1633		-0.0295		-0.0663		-4.2681		-4.8126		0.1722		-0.8727	
	(0.098)		(0.125)		(0.072)		(0.044)		(3.828)		(3.553)		(1.421)		(0.962)	
1st Lag of Bank Assets to GDP Ratio	0.015		-0.1698*	-0.041	0.0687	0.075*	0.0676		5.0866		4.8756*		1.5457		0.9109	
	(0.092)		(0.091)	(0.076)	(0.082)	(0.042)	(0.057)		(5.491)		(2.765)		(1.898)		(0.847)	
2nd Lag of Bank Assets to GDP Ratio	-0.0529	-0.0634	-0.0835		-0.0047		0.0321	0.0782**	-2.3213	-2.187	-1.0549		-0.6548		0.1027	1.0703**
	(0.073)	(0.059)	(0.099)		(0.022)		(0.027)	(0.037)	(1.989)	(2.473)	(3.746)		(0.631)		(0.424)	(0.517)
3rd Lag of Bank Assets to GDP Ratio	0.0672		0.1389		0.01		-0.0059		2.7427		0.703	1.6987	0.7503	1.6714**	0.1079	
	(0.067)		(0.083)		(0.022)		(0.026)		(2.767)		(3.085)	(8.215)	(0.505)	(0.678)	(0.337)	
1st Lag of Gross Secondary School Enrolment Rate	0.1862	-0.1054	0.114	0.3744*	-0.035	-0.1288	0.0451	-0.0305	16.1978**	8.5501	8.3579	7.0645	0.3843	0.7466	2.0215	3.4873
	(0.13)	(0.28)	(0.143)	(0.218)	(0.161)	(0.104)	(0.13)	(0.139)	(6.609)	(6.81)	(7.886)	(24.957)	(2.31)	(2.825)	(2.043)	(3.354)
1st Lag of Inflation Rate			0.0667	-0.1527*			-0.0151	-0.0904			-1.4034	-0.7341			1.7033	3.726***
			(0.188)	(0.083)			(0.154)	(0.132)			(9.803)	(17.472)			(4.543)	(1.377)
1st Lag of Government Consumption to GDP Ratio			-0.0882	-0.1073			0.1091	0.1623			7.292	4.7824			1.126	3.3562
			(0.216)	(0.222)			(0.099)	(0.105)			(10.793)	(14.079)			(1.211)	(2.506)
1st Lag of FDI to GDP Ratio			0.0352	-0.0196			0.0445	0.0494			0.1312	0.8679			0.8957	1.0578**
			(0.084)	(0.062)			(0.03)	(0.039)			(2.291)	(8.099)			(0.695)	(0.514)
1st Lag of Trade to GDP Ratio			0.1592	0.5872**			0.1341	0.25*			0.8988	8.7388			-0.0138	-0.1611
			(0.371)	(0.247)			(0.119)	(0.149)			(13.167)	(10.573)			(1.732)	(2.279)
Constant	0.6285	1.2527	-0.7729	-0.909	0.0593	-0.2231	-0.644	-1.2727**	-29.3338	13.2955	2.5364	-46.5099	6.9481	7.1284	-0.3223	-4.7785
	(0.712)	(0.939)	(2.735)	(1.405)	(0.253)	(0.244)	(0.491)	(0.604)	(30.475)	(75.403)	(102.795)	(95.552)	(4.777)	(4.646)	(6.875)	(9.907)
Observations	77	102	65	103	203	299	189	230	77	102	65	65	203	203	189	230
Groups	27	29	25	27	70	74	66	70	27	29	25	25	70	70	66	70
Instruments	27	25	31	27	29	27	60	56	27	25	31	25	29	23	60	56
AR(1)	-0.85	-1.93	-1.17	-1.28	-2	-2.31	-2.32	-2.22	-1.59	-1.69	-1.16	-0.39	-1.92	-1.87	-1.61	-2.17
AR(1) p-value	0.394	0.054	0.241	0.201	0.045	0.021	0.02	0.026	0.112	0.092	0.246	0.698	0.054	0.062	0.108	0.03
AR(2)	-0.47	0.13	-1.15	-0.68	-1.63	-2.82	-2.35	-1.88	1.37	0.4	0.19	1.15	0.82	0.8	0.37	0.39
AR(2) p-value	0.642	0.897	0.249	0.5	0.104	0.005	0.019	0.06	0.172	0.691	0.849	0.249	0.41	0.421	0.712	0.694
Sargan Overidentification Test	47.61	57.33	30.11	32.26	33.07	11.74	93.63	86.41	30.8	24.65	11.03	6.44	43.66	33	76.43	65.33
Sargan p-value	0	0	0.026	0.004	0.024	0.86	0	0	0.021	0.103	0.855	0.954	0.001	0.007	0.003	0.02
Hansen Overidentification Test	13.51	18.62	15.54	17.65	17.25	12.97	50.47	45.1	7.48	16.31	2.06	4.65	30.26	18.01	53.76	48.99
Hansen p-value	0.701	0.351	0.557	0.223	0.573	0.793	0.301	0.426	0.976	0.502	1	0.99	0.049	0.323	0.201	0.28

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.13: Bank Liabilities to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries				
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate				
Independent Variables																	
1st Lag of Initial Real GNI per Capita	0.9573***	0.989***	0.8904***	0.6894***	0.9321***	0.9887***	0.9898***	0.9934***	-1.5002	-5.9165	-4.2314	-5.9253	-0.1546	-1.0607	0.2321	-0.5733	-1.477
	(0.1)	(0.118)	(0.222)	(0.154)	(0.181)	(0.124)	(0.072)	(0.058)	(6.009)	(5.601)	(5.093)	(8.02)	(3.242)	(1.372)	(0.767)	(1.22)	(1.065)
Bank Liabilities to GDP Ratio	0.143	0.1475**	0.0102	0.1038	0.0632		0.0458	0.0155	-4.6396	2.3878	0.8724		0.626	-0.5395	-0.1935		-0.5897
	(0.122)	(0.058)	(0.08)	(0.074)	(0.052)		(0.038)	(0.034)	(3.857)	(1.714)	(5.419)		(0.847)	(0.391)	(0.6)		(0.465)
1st Lag of Bank Liabilities to GDP Ratio	0.0324		0.0571		-0.0398	0.0783	-0.0475		6.4796**		0.591		-0.8703		-1.0503	-	
	(0.086)		(0.092)		(0.04)	(0.053)	(0.034)		(2.515)		(2.634)		(1.014)		(0.685)	1.0199***	
2nd Lag of Bank Liabilities to GDP Ratio	-0.0105		-0.034		-0.0011		0.0202		-3.9539		0.5111	2.1068	-0.0433		0.2722		
	(0.081)		(0.13)		(0.023)		(0.022)		(2.535)		(4.061)	(3.619)	(0.474)		(0.388)		
3rd Lag of Bank Liabilities to GDP Ratio	0.0853		0.0058		0.0013		-0.0165		2.1167		1.5855		0.133		-0.5601*	-0.561***	
	(0.059)		(0.08)		(0.02)		(0.028)		(2.321)		(2.778)		(0.489)		(0.296)	(0.209)	
1st Lag of Gross Secondary School Enrolment Rate	-0.0434	-0.2719	0.3422	0.3747	0.1352	-0.0363	0.0759	0.0498	17.5437	-0.9878	10.221	7.5003	1.3478	3.5247	1.6795	3.0419*	3.9733**
	(0.252)	(0.325)	(0.233)	(0.384)	(0.303)	(0.122)	(0.132)	(0.121)	(17.433)	(10.572)	(9.361)	(13.372)	(4.756)	(2.211)	(1.354)	(1.677)	(1.746)
1st Lag of Inflation Rate			-0.0037	-0.108			-0.1966	-0.1845*			-0.6476	-0.8532			-1.6739	-2.3135	1.0487
			(0.127)	(0.101)			(0.255)	(0.099)			(7.553)	(3.519)			(3.019)	(2.738)	(1.42)
1st Lag of Government Consumption to GDP Ratio			0.1838	-0.2365			0.0359	0.0043			0.223	-2.2089			1.9513*	1.531	1.9692
			(0.324)	(0.375)			(0.146)	(0.084)			(8.549)	(13.347)			(1.053)	(1.602)	(2.034)
1st Lag of FDI to GDP Ratio			-0.0397	0.0026			0.0362	0.0383			0.5784	0.097			0.7534	0.8749*	0.6487
			(0.113)	(0.056)			(0.029)	(0.031)			(3.414)	(3.289)			(0.463)	(0.522)	(0.435)
1st Lag of Trade to GDP Ratio			0.5592*	0.4403*			0.1066	0.1433			5.6053	6.9851			-0.2643	-1.9337	-0.1151
			(0.319)	(0.228)			(0.145)	(0.094)			(10.187)	(14.931)			(1.298)	(1.498)	(1.614)
Constant	0.5189	0.6813	-3.1161	0.0533	0.1393	0.1232	-0.6702	-0.6414	-54.7899	44.2658	-35.2125	-3.4975	-1.2388	-4.0863	-9.8515	2.831	-3.7036
	(0.916)	(0.549)	(2.66)	(1.126)	(0.338)	(0.542)	(0.534)	(0.43)	(71.589)	(32.278)	(46.568)	(91.749)	(10.117)	(5.515)	(6.179)	(8.23)	(7.334)
Observations	73	124	62	99	191	288	179	263	73	124	62	83	191	297	179	179	263
Groups	26	28	24	26	66	73	62	70	26	28	24	26	66	74	62	62	70
Instruments	25	26	31	27	29	27	60	59	25	28	31	26	29	29	60	57	59
AR(1)	-1.13	-1.11	-0.68	-0.65	-2.06	-2.52	-2.29	-2.33	-1.89	-0.94	-1.27	-1.38	-1.89	-2.65	-1.63	-1.65	-2.48
AR(1) p-value	0.257	0.266	0.498	0.513	0.04	0.012	0.022	0.02	0.059	0.347	0.205	0.169	0.059	0.008	0.103	0.098	0.013
AR(2)	-0.67	-1.17	-0.92	-1.11	-1.8	-2.69	-1.76	-1.77	1.43	0.65	0.86	0.91	0.64	0.29	0.59	0.48	1.28
AR(2) p-value	0.5	0.243	0.356	0.269	0.072	0.007	0.079	0.077	0.151	0.515	0.391	0.363	0.524	0.773	0.558	0.632	0.201
Sargan Overidentification Test	36.14	54.03	27.7	23.01	33.76	18.05	111.8	97.64	22.01	35.28	19.07	9.23	34.23	44.87	71.7	69.22	79.92
Sargan p-value	0.002	0	0.049	0.06	0.02	0.452	0	0	0.107	0.013	0.324	0.816	0.017	0.001	0.009	0.012	0.001
Hansen Overidentification Test	17	18	9.4	12.81	19.98	15.49	50.31	46.53	5.72	21.87	1.84	1.93	32.18	24.38	45.31	44.52	49.03
Hansen p-value	0.319	0.389	0.927	0.541	0.396	0.628	0.307	0.451	0.984	0.291	1	1	0.03	0.182	0.501	0.492	0.353

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.14: Money Supply to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155
Country Group	Natural Resource-Based Countries				Other Countries						Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita						Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																		
1st Lag of Initial Real GNI per Capita	0.9137***	0.9795***	0.8715***	0.696***	0.8482***	0.896***	0.9618***	0.8836***	0.9301***	0.9024***	-3.3422	-2.1681	-4.1991	-1.322	-2.1408**	-2.6731**	-2.102***	-2.5162*
	(0.088)	(0.153)	(0.107)	(0.185)	(0.036)	(0.069)	(0.08)	(0.083)	(0.044)	(0.066)	(2.322)	(1.612)	(3.311)	(5.717)	(0.928)	(1.144)	(0.731)	(1.291)
Money Supply to GDP Ratio	0.1485		0.3144*	0.1938	0.3786***	0.3837***	0.4065**		0.0994		-12.7265		-3.5899	-9.1437	1.0413		1.0689	
	(0.18)		(0.178)	(0.186)	(0.133)	(0.123)	(0.166)		(0.123)		(17.78)		(9.104)	(9.817)	(3.086)		(2.85)	
1st Lag of Money Supply to GDP Ratio	-0.1673		-0.412*		-0.3825**	-	-0.2735*		-0.0738	0.1829**	10.7264		-3.2874		-0.7855		-0.2405	3.0239**
	(0.172)		(0.237)		(0.153)	0.3448***	(0.155)		(0.139)	(0.082)	(14.277)		(7.165)		(3.345)		(3.105)	(1.337)
2nd Lag of Money Supply to GDP Ratio	0.1091	-0.1782	0.1667		0.1593**	0.1452**			0.075		1.8874		5.0007		0.9966	3.6548***	0.4922	
	(0.082)	(0.137)	(0.145)		(0.072)	(0.069)			(0.097)		(3.912)		(4.231)		(1.49)	(1.33)	(1.079)	
3rd Lag of Money Supply to GDP Ratio	-0.1169		-0.2428		0.0239			0.2185**	-0.0068		-6.5717	-3.2571	-1.8525		1.0793		0.81	
	(0.123)		(0.178)		(0.047)			(0.089)	(0.066)		(6.778)	(3.686)	(8.182)		(0.753)		(0.901)	
1st Lag of Gross Secondary School Enrolment Rate	0.3345**	0.1111	0.252*	0.3349	0.246***	0.1258	0.0254	0.2169	0.1426*	0.1233	4.4188	2.1728	0.2192	11.8448	3.7005**	4.3329**	3.0291**	3.5641
	(0.156)	(0.228)	(0.138)	(0.234)	(0.076)	(0.127)	(0.134)	(0.158)	(0.079)	(0.086)	(6.516)	(5.302)	(13.775)	(12.475)	(1.716)	(2.022)	(1.398)	(2.178)
1st Lag of Inflation Rate			-0.0134	0.0286					-0.0263	-0.1553			-1.3788	-5.2192			3.3572	2.1285
			(0.069)	(0.076)					(0.139)	(0.098)			(3.323)	(4.052)			(4.187)	(1.737)
1st Lag of Government Consumption to GDP Ratio			0.2199	-0.1263					0.0247	0.1047			3.4395	-5.5266			1.8673	3.6766
			(0.235)	(0.263)					(0.113)	(0.119)			(5.367)	(8.388)			(1.884)	(2.4)
1st Lag of FDI to GDP Ratio			0.0401	0.0078					-0.0039	0.0046			-0.1144	-0.2603			0.0235	-0.0624
			(0.063)	(0.04)					(0.029)	(0.035)			(1.567)	(1.64)			(0.643)	(0.386)
1st Lag of Trade to GDP Ratio			0.4278	0.6764***					0.1418*	0.1717			12.5158*	-2.2904			0.0294	0.4215
			(0.283)	(0.191)					(0.079)	(0.109)			(6.929)	(9.689)			(1.011)	(1.373)
Constant	-0.3409	0.5488	-1.7306	-	-0.2431	-0.2597	-0.0949	-0.5254	-0.8854*	-1.1993**	34.3011	19.3227	-16.7484	24.5339	-4.0237	-10.687	-7.0138	-13.5414*
	(0.699)	(0.899)	(1.757)	2.1224***	(0.232)	(0.308)	(0.245)	(0.376)	(0.489)	(0.486)	(37.761)	(21.201)	(36.118)	(75.247)	(4.453)	(12.788)	(6.601)	(6.916)
Observations	124	133	99	110	293	313	343	297	267	294	124	128	99	110	293	317	267	294
Groups	30	31	27	29	75	81	81	76	71	77	30	30	27	29	75	81	71	77
Instruments	30	29	33	27	35	35	35	29	65	61	30	28	33	27	35	31	65	61
AR(1)	0.15	-1.31	0.14	-0.44	-1.99	-2.4	-1.84	-2.03	-1.74	-2.1	-1.06	-1.61	-1.19	-1.25	-2.86	-2.94	-2.71	-2.63
AR(1) p-value	0.881	0.189	0.887	0.657	0.047	0.017	0.066	0.042	0.082	0.036	0.287	0.106	0.233	0.213	0.004	0.003	0.007	0.009
AR(2)	-1.91	-1.71	0.88	0.6	-0.92	-1.17	-2.21	-1.62	-1.88	-2.43	-1.02	-0.38	1.09	1.27	0.81	0.6	1.45	1.16
AR(2) p-value	0.056	0.088	0.376	0.546	0.359	0.242	0.027	0.106	0.059	0.015	0.309	0.706	0.278	0.204	0.416	0.55	0.148	0.245
Sargan Overidentification Test	38.6	51.54	49.19	35.84	46.86	41.04	43.78	44.75	124.79	101.39	29.78	32.04	19.63	12.92	35.07	31.24	78.66	77.73
Sargan p-value	0.003	0	0	0.001	0.002	0.008	0.004	0.001	0	0	0.04	0.031	0.293	0.533	0.038	0.052	0.005	0.004
Hansen Overidentification Test	20.62	23.74	7.28	15.45	26.45	27.23	29.98	21.99	58.77	50.71	14.07	23.32	2.87	3.62	32.67	25.62	48.31	48.21
Hansen p-value	0.299	0.254	0.98	0.348	0.233	0.203	0.119	0.285	0.16	0.367	0.725	0.223	1	0.997	0.067	0.179	0.501	0.464

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.15: Broad Money Supply to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Linear Specification

Model Number	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GNI per Capita	0.8756***	1.1521***	0.5035	0.9284***	1.0669***	0.9442***	1.0269***	0.9367***	2.1567	4.0821	5.0336	-0.8694	1.8338	0.6399	0.5224	0.4308
	(0.149)	(0.268)	(0.843)	(0.267)	(0.086)	(0.097)	(0.06)	(0.053)	(9.831)	(5.216)	(4.712)	(14.691)	(1.514)	(1.787)	(0.635)	(0.741)
Broad Money Supply to GDP Ratio	0.3318		0.9776		0.0334		0.0617		10.3123		()		-3.2705		1.3532	
	(0.716)		(0.949)		(0.182)		(0.206)		(10.681)				(3.957)		(2.395)	
1st Lag of Broad Money Supply to GDP Ratio	0.1927		0.1767		-0.0544		-0.1344		-8.3437		()	-11.9344	6.2449		-1.8243	
	(1.163)		(1.705)		(0.284)		(0.222)		(16.794)			(14.682)	(4.134)		(2.401)	
2nd Lag of Broad Money Supply to GDP Ratio				-0.3929										5.3105*		2.445
				(0.53)										(3.115)		(2.296)
3rd Lag of Broad Money Supply to GDP Ratio		-0.2263				0.355				-						
		(0.317)				(0.294)				10.7447**						
1st Lag of Gross Secondary School Enrolment Rate	0.0677	0.1019	()	0.0916	-0.0566	0.0013	0.1046	0.3054***	-7.6517	3.024	-14.9747	-0.7515	-4.0608	-3.1449	0.6689	-0.8904
	(0.37)	(0.155)		(0.737)	(0.095)	(0.235)	(0.102)	(0.111)	(16.76)	(4.788)	(17.929)	(19.639)	(2.747)	(3.791)	(1.361)	(1.008)
1st Lag of Inflation Rate			-0.0016	-0.1296			-0.353	-0.1322			4.4817	1.7003			-1.2103	6.9572
			(0.314)	(0.452)			(0.385)	(0.133)			(8.959)	(10.622)			(2.961)	(11.073)
1st Lag of Government Consumption to GDP Ratio			()	0.4352			-0.1695	-0.0489			9.399	8.5506			-2.712*	-1.0469
				(0.83)			(0.159)	(0.122)			(25.877)	(15.274)			(1.419)	(1.725)
1st Lag of FDI to GDP Ratio			0.0223	-0.031			-0.0621	-0.0449			-2.0774	-0.3018			-1.2465***	-0.8145
			(0.09)	(0.053)			(0.04)	(0.046)			(5.058)	(1.904)			(0.393)	(0.593)
1st Lag of Trade to GDP Ratio			()	0.1979			0.1034	-0.0294			()	20.1469			1.0834	-0.8228
				(0.781)			(0.148)	(0.095)				(13.801)			(1.295)	(1.962)
Constant	-1.4384	-0.6767	()	()	-0.1221	-0.7391	-0.1596	0.2212	-4.6573	-6.2535	()	-53.8227	-9.2329	-10.7023	-0.1209	-0.1153
	(2.855)	(1.12)			(0.515)	(0.498)	(0.498)	(0.501)	(58.148)	(27.475)		(60.882)	(5.729)	(7.538)	(6.019)	(9.715)
Observations	46	47	30	34	131	140	108	119	46	47	30	37	131	139	108	124
Groups	14	15	10	12	40	31	38	39	14	15	10	16	40	37	38	35
Instruments	18	15	30	32	35	29	36	34	18	15	29	27	35	31	36	34
AR(1)	-0.06	-0.1	-0.56		-1.46	-1.84	-1.34	-1.37	-0.67	-1.26	-0.47	-0.29	-1.77	-1.97	-1.54	-1.67
AR(1) p-value	0.953	0.918	0.572		0.144	0.066	0.181	0.171	0.506	0.209	0.635	0.772	0.077	0.049	0.125	0.096
AR(2)	-0.54	-1.21	0.03	-0.58	-0.52	0.42	-0.2	-0.26	0.11	-1.17	0.32	0.03	0.02	0.31	1.54	0.63
AR(2) p-value	0.591	0.226	0.974	0.565	0.605	0.672	0.841	0.791	0.912	0.241	0.748	0.973	0.984	0.76	0.122	0.527
Sargan Overidentification Test	7.16	10.39	27.73	63.2	27.2	49.98	48.58	49.4	5.68	3.24	39.12	40.22	24.81	26.63	26.61	30.34
Sargan p-value	0.412	0.109	0.034	0	0.204	0	0.001	0	0.577	0.778	0.001	0	0.306	0.146	0.227	0.085
Hansen Overidentification Test	2.92	4.82	0	0	18.24	17.37	22.54	17.06	0.51	4.81	0	6.09	21.96	19.77	19.65	23.36
Hansen p-value	0.892	0.568	1	1	0.692	0.565	0.428	0.708	0.999	0.569	1	0.964	0.462	0.472	0.605	0.325

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.16: Credit to Private Sector to GDP & Investment to GDP: Dynamic Panel GMM Models with Linear Specification

Model Number	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188
Country Group	Natural Resource-Based Countries				Other Countries					Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio					Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																	
1st Lag of Initial Real GDP per Capita	0.0218	0.0249	0.0835	0.1673	-0.0706	-0.1312*	-0.1244*	-0.0646	-0.1074**	0.066	0.044	0.1142	-0.1238	-0.0619	-0.0814	-0.0548	-0.039
	(0.058)	(0.056)	(0.086)	(0.119)	(0.081)	(0.079)	(0.072)	(0.058)	(0.053)	(0.062)	(0.075)	(0.161)	(0.195)	(0.111)	(0.078)	(0.12)	(0.087)
1st Lag of Investment to GDP Ratio	0.6107***	0.6659***	0.4897**	0.9126***	0.6686***	0.6024***	0.7199***	0.6044***	0.4926***								
	(0.079)	(0.089)	(0.205)	(0.199)	(0.092)	(0.131)	(0.123)	(0.138)	(0.115)								
1st Lag of Private Investment to GDP Ratio										0.5766**	0.7267***	0.6645**	0.5263*	0.4871*	0.493***	0.5432***	0.5924***
										(0.256)	(0.108)	(0.297)	(0.302)	(0.273)	(0.126)	(0.188)	(0.185)
Credit to Private Sector to GDP Ratio	0.3024***		0.1795		0.117		0.301	0.274*	0.1942**	0.0789		-0.0447		0.0476	0.2293**	0.3266*	0.1728
	(0.094)		(0.198)		(0.156)		(0.184)	(0.142)	(0.097)	(0.348)		(0.199)		(0.18)	(0.114)	(0.184)	(0.1656)
1st Lag of Credit to Private Sector to GDP Ratio	-		-0.1646	-0.1902	-0.0409		-0.2313	-0.1773**		-0.2374	0.1054	0.1185	0.2047	0.1801		-0.2196	
	0.4289***		(0.213)	(0.119)	(0.165)		(0.2)	(0.088)		(0.337)	(0.08)	(0.332)	(0.223)	(0.223)		(0.23)	
2nd Lag of Credit to Private Sector to GDP Ratio	0.1534**		-0.0522		-0.0395	0.1134	0.0388			0.3485**		-0.1275		-0.1178		0.0306	
	(0.073)		(0.1)		(0.06)	(0.074)	(0.087)			(0.152)		(0.249)		(0.094)		(0.096)	
3rd Lag of Credit to Private Sector to GDP Ratio	-0.085	-0.0802	0.042		0.0433		0.0206			-		0.0109		0.0463		0.0429	
	(0.072)	(0.069)	(0.103)		(0.031)		(0.054)			0.3301***		(0.235)		(0.052)		(0.065)	
1st Lag of Gross Secondary School Enrolment Rate	0.0997*	0.0913	-0.0364	-0.1574	0.0854	0.2167*	0.0997	0.067	0.05	0.3145*	0.2166	0.0116	0.4779*	0.057	0.0304	0.0334	-0.0061
	(0.052)	(0.102)	(0.134)	(0.192)	(0.168)	(0.118)	(0.095)	(0.084)	(0.087)	(0.164)	(0.135)	(0.304)	(0.261)	(0.108)	(0.102)	(0.158)	(0.106)
1st Lag of Inflation Rate			-0.157	-0.195*			0.0183	0.0204	0.0986			-0.1892	-0.0437			-0.1349	0.0721
			(0.13)	(0.099)			(0.272)	(0.141)	(0.168)			(0.162)	(0.219)			(0.221)	(0.221)
1st Lag of Government Consumption to GDP Ratio			-0.1909	-0.0371			0.2023*	0.1466	0.1634			-0.4955	-0.9306**			0.2233	0.3048
			(0.329)	(0.22)			(0.116)	(0.115)	(0.112)			(0.413)	(0.424)			(0.204)	(0.248)
1st Lag of FDI to GDP Ratio			-0.0842	-0.0357			-0.0103	0.0137	0.0383			-0.0308	0.0214			0.0362	-0.0017
			(0.055)	(0.068)			(0.032)	(0.04)	(0.047)			(0.059)	(0.098)			(0.046)	(0.062)
1st Lag of Trade to GDP Ratio			0.159	-0.0185			-0.2213	-0.1857	-0.1492			-0.2771	0.0604			-0.0348	0.1075
			(0.287)	(0.411)			(0.145)	(0.126)	(0.146)			(0.669)	(0.327)			(0.222)	(0.237)
Constant	0.7987*	0.759	0.6964	0.3988	0.9134***	1.0026***	1.3613*	1.449**	1.6589***	-0.1797	0.4868	2.6529	1.9567	1.0732*	0.9236*	0.4351	-0.6093
	(0.461)	(0.632)	(1.384)	(1.477)	(0.293)	(0.363)	(0.715)	(0.633)	(0.624)	(1.127)	(2.027)	(2.124)	(1.925)	(0.574)	(0.481)	(1.065)	(0.904)
Observations	169	173	128	149	404	437	365	393	395	112	126	89	100	237	269	216	238
Groups	43	43	39	42	97	98	92	95	95	31	32	29	30	67	68	64	65
Instruments	42	36	36	30	43	39	73	71	70	28	31	36	30	42	40	60	62
AR(1)	-2.98	-3.15	-1.9	-2.43	-2.55	-2.43	-2.53	-2.48	-2.11	-0.58	-2.4	-1.37	-0.42	-1.57	-2.47	-1.97	-2.27
AR(1) p-value	0.003	0.002	0.058	0.015	0.011	0.015	0.011	0.013	0.035	0.559	0.016	0.171	0.676	0.117	0.014	0.048	0.023
AR(2)	0.42	1	1.04	0.45	-2.19	-2.34	-1.94	-2.28	-2.56	-0.12	1.18	-0.5	-1.18	-1.4	-1.28	-0.77	-0.51
AR(2) p-value	0.674	0.319	0.297	0.651	0.028	0.019	0.053	0.023	0.011	0.901	0.237	0.619	0.24	0.161	0.2	0.438	0.607
Sargan Overidentification Test	38.47	41.69	27.45	13.7	34.89	33.11	60.55	59.73	60.86	18.51	17.57	33.38	27.49	20.47	29.02	40.64	32.85
Sargan p-value	0.112	0.026	0.095	0.621	0.208	0.194	0.315	0.342	0.305	0.237	0.616	0.022	0.036	0.878	0.464	0.574	0.953
Hansen Overidentification Test	26.64	32.9	24.48	11.72	32.16	25.28	69.25	60.68	70.3	12.04	14.82	15.47	15.05	25.76	28.83	37.05	48.89
Hansen p-value	0.591	0.165	0.178	0.763	0.313	0.559	0.11	0.311	0.095	0.676	0.787	0.692	0.521	0.638	0.474	0.726	0.437

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated

Table A.17: Bank Assets to GDP & Investment to GDP: Dynamic Panel GMM Models with Linear Specification

Model Number	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries					Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio					Private Investment to GDP Ratio			
Independent Variables																	
1st Lag of Initial Real GDP per Capita	0.0221	-0.0547	0.0265	-0.015	-0.0965	-0.0064	-	-0.1846*	0.0213	0.038	0.0984	0.2489*	0.2141	-0.0883	0.1849	-0.1889	-0.0367
	(0.071)	(0.073)	(0.119)	(0.049)	(0.165)	(0.078)	0.2272***	(0.107)	(0.083)	(0.072)	(0.181)	(0.138)	(0.133)	(0.13)	(0.134)	(0.158)	(0.158)
1st Lag of Investment to GDP Ratio	0.6573***	0.7483***	0.5881*	0.6682***	0.545***	0.1435	0.4714***	0.6554***									
	(0.079)	(0.133)	(0.344)	(0.143)	(0.156)	(0.196)	(0.151)	(0.162)									
1st Lag of Private Investment to GDP Ratio									0.5268***	0.7748***	0.4015	0.3256	0.5117	0.5126***	0.3235*	0.4918**	0.2907
									(0.154)	(0.107)	(0.502)	(0.514)	(0.406)	(0.19)	(0.171)	(0.239)	(0.338)
Bank Assets to GDP Ratio	0.071		0.0216		0.0164		0.0234		0.1085		-0.0136			0.0713	0.0635	-0.0269	
	(0.102)		(0.156)		(0.072)		(0.051)		(0.073)		(0.366)			(0.115)	(0.0618)	(0.094)	
1st Lag of Bank Assets to GDP Ratio	-0.1269	-0.1349	-0.0544		0.1691	0.1579***	0.122*		-0.0853	-0.0844	0.057			0.0213		-0.0435	
	(0.083)	(0.089)	(0.176)		(0.103)	(0.048)	(0.066)		(0.1)	(0.116)	(0.472)			(0.101)		(0.163)	
2nd Lag of Bank Assets to GDP Ratio	-0.0474		-0.0238		-0.0178		0.0154		-0.133		-0.1522	-0.3935**		0.0463		0.0799	0.0914
	(0.056)		(0.105)		(0.047)		(0.045)		(0.094)		(0.38)	(0.154)		(0.065)		(0.073)	(0.062)
3rd Lag of Bank Assets to GDP Ratio	0.003		0.0574	0.102***	-0.0062		0.0255	0.1066**	0.1734		0.1958	0.4749**	0.3603	-0.0222		-0.0121	
	(0.082)		(0.083)	(0.035)	(0.026)		(0.031)	(0.046)	(0.11)		(0.127)	(0.197)	(0.325)	(0.031)		(0.037)	
1st Lag of Gross Secondary School Enrolment Rate	-0.0531	-0.0444	-0.1503	-0.1701*	0.0533	-0.0658	0.2494*	0.1827	-0.0369	0.1285	-0.1028	-0.0984	-0.3709	0.0343	-0.0198	0.1609	0.0047
	(0.111)	(0.11)	(0.161)	(0.088)	(0.241)	(0.125)	(0.132)	(0.203)	(0.171)	(0.179)	(0.327)	(0.296)	(0.289)	(0.155)	(0.172)	(0.16)	(0.262)
1st Lag of Inflation Rate			-0.0673	-0.1266			-0.1359	0.0924			-0.0743	-0.2537	-0.0135			0.0456	-0.0103
			(0.316)	(0.105)			(0.25)	(0.325)			(0.333)	(0.445)	(0.382)			(0.438)	(0.154)
1st Lag of Government Consumption to GDP Ratio			-0.21	-0.2824**			0.0233	0.0889			-0.4533	-0.4381	-0.2226			0.2739	0.4978*
			(0.248)	(0.128)			(0.132)	(0.103)			(0.391)	(0.408)	(0.247)			(0.31)	(0.293)
1st Lag of FDI to GDP Ratio			-0.0304	-0.0483**			0.0234	0.0108			0.1015	0.2128*	0.1247			0.0992	0.1514***
			(0.065)	(0.023)			(0.045)	(0.055)			(0.134)	(0.12)	(0.125)			(0.095)	(0.053)
1st Lag of Trade to GDP Ratio			-0.0793	-0.1266			-0.0631	-0.0529			-0.3266	-0.6794	-0.6274			0.005	0.1484
			(0.255)	(0.111)			(0.161)	(0.178)			(0.707)	(0.793)	(0.523)			(0.287)	(0.313)
Constant	1.1076*	1.6621**	2.4733	2.9311***	1.588**	2.6543***	2.2743***	1.605*	1.2609*	0.0003	3.6972	4.3195	3.9375**	1.588***	0.4312	1.5003	0.2038
	(0.647)	(0.701)	(1.597)	(0.797)	(0.626)	(0.699)	(0.75)	(0.823)	(0.662)	(0.987)	(2.296)	(2.887)	(1.839)	(0.483)	(0.653)	(1.077)	(1.454)
Observations	110	182	89	89	263	395	242	242	75	122	61	61	61	156	241	143	183
Groups	40	43	36	36	85	90	81	81	29	31	25	25	25	55	62	52	58
Instruments	37	35	34	28	37	35	68	62	28	32	34	30	28	37	36	48	51
AR(1)	-1.61	-2.9	-1.13	-1.35	-1.78	-0.88	-1.66	-1.56	-1.22	-2.28	-0.66	-0.43	-0.53	-1.5	-1.75	-1.62	-1.04
AR(1) p-value	0.107	0.004	0.256	0.177	0.075	0.376	0.096	0.119	0.224	0.023	0.509	0.669	0.595	0.134	0.08	0.105	0.298
AR(2)	-0.37	0.87	-0.05	-0.16	-2.11	-2.75	-2.04	-1.74	0.45	1.24	0.41	-0.68	-0.58	-1.18	-1.26	-1.11	-1.37
AR(2) p-value	0.711	0.386	0.96	0.872	0.035	0.006	0.041	0.082	0.651	0.216	0.684	0.497	0.565	0.238	0.207	0.266	0.171
Sargan Overidentification Test	33.63	27.36	30.87	23.99	52.04	34.31	73.7	55.27	21.39	15.32	31.34	23.1	27.53	26.62	23.96	35.98	46.11
Sargan p-value	0.145	0.338	0.042	0.09	0.002	0.101	0.032	0.282	0.209	0.848	0.037	0.146	0.036	0.429	0.578	0.331	0.172
Hansen Overidentification Test	25.25	32.69	20.03	20.15	34.32	26.84	56.37	58.62	10.91	15.63	14.91	12.42	16.45	23.68	24.61	33.96	34.76
Hansen p-value	0.505	0.139	0.392	0.214	0.127	0.364	0.35	0.189	0.861	0.834	0.729	0.774	0.422	0.594	0.541	0.421	0.62

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.18: Bank Liabilities to GDP & Investment to GDP: Dynamic Panel GMM Models with Linear Specification

Model Number	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.0145	-0.0148	0.0227	-0.0135	-0.0355	0.0451	-0.1394	-0.0207	0.0064	0.0899	-0.0299	-0.0527	-0.041	0.1548	-0.0341	-0.0309
	(0.058)	(0.07)	(0.076)	(0.145)	(0.135)	(0.084)	(0.101)	(0.052)	(0.081)	(0.145)	(0.123)	(0.131)	(0.159)	(0.266)	(0.172)	(0.192)
1st Lag of Investment to GDP Ratio	0.6872***	0.7874***	0.8235***	0.7165*	0.6713***	0.4013***	0.6127***	0.6009***								
	(0.103)	(0.095)	(0.163)	(0.386)	(0.142)	(0.144)	(0.148)	(0.129)								
1st Lag of Private Investment to GDP Ratio									0.5411**	0.4278*	0.7863***	0.3518	0.5289**	0.6904**	0.4902***	0.3737**
									(0.25)	(0.233)	(0.253)	(0.351)	(0.209)	(0.346)	(0.179)	(0.19)
Bank Liabilities to GDP Ratio	0.103		0.1661		0.2027***	0.0743*	0.0557		0.0771		0.2069		0.0917		0.0565	
	(0.062)		(0.101)		(0.064)	(0.043)	(0.042)		(0.12)		(0.21)		(0.098)		(0.061)	
1st Lag of Bank Liabilities to GDP Ratio	-0.1726*	-0.103***	-0.2306**		-0.0704		-0.0414	-0.0397	-0.1612		-0.2224		0.0455		-0.0098	
	(0.086)	(0.033)	(0.104)		(0.048)		(0.03)	(0.033)	(0.134)		(0.209)		(0.057)		(0.063)	
2nd Lag of Bank Liabilities to GDP Ratio	0.0515		0.0634		-0.0048		0.0027		-0.0265		-0.0392	-0.1123	-0.0944**	-0.1057	-0.02	
	(0.041)		(0.077)		(0.024)		(0.026)		(0.11)		(0.237)	(0.127)	(0.04)	(0.077)	(0.043)	
3rd Lag of Bank Liabilities to GDP Ratio	0.0044		0.0163	0.0592	0.0519**		0.013		-0.0847	-0.323	0.021		0.0273		-0.0228	-0.0825**
	(0.037)		(0.066)	(0.08)	(0.024)		(0.021)		(0.131)	(0.282)	(0.146)		(0.042)		(0.028)	(0.042)
1st Lag of Gross Secondary School Enrolment Rate	0.0484	-0.0484	-0.0932	-0.1009	-0.2233	-0.0975	0.2001	0.0712	0.1384	0.0505	-0.0358	0.2123	0.011	-0.1221	0.0176	0.0949
	(0.085)	(0.091)	(0.129)	(0.24)	(0.271)	(0.137)	(0.168)	(0.072)	(0.138)	(0.268)	(0.232)	(0.242)	(0.193)	(0.203)	(0.145)	(0.156)
1st Lag of Inflation Rate			0.0213	0.0122			-0.1581	-0.1147			-0.2469	-0.0978			-0.5697	-0.2181
			(0.166)	(0.229)			(0.208)	(0.089)			(0.313)	(0.189)			(0.403)	(0.389)
1st Lag of Government Consumption to GDP Ratio			-0.0246	-0.1405			0.0714	0.1444			-0.2192	0.0852			0.0242	0.1777
			(0.24)	(0.315)			(0.083)	(0.125)			(0.327)	(0.406)			(0.172)	(0.191)
1st Lag of FDI to GDP Ratio			-0.0374	-0.0782*			0.0504	0.0059			0.0182	-0.0617			0.0272	0.0768
			(0.042)	(0.046)			(0.037)	(0.038)			(0.117)	(0.046)			(0.044)	(0.092)
1st Lag of Trade to GDP Ratio			-0.1211	-0.0554			-0.1342	-0.0794			-0.4145	0.5074			-0.2194	-0.1956
			(0.271)	(0.266)			(0.098)	(0.148)			(0.493)	(0.418)			(0.213)	(0.217)
Constant	0.7536*	1.1501**	1.4197	1.8678	1.8436***	1.7062***	1.8747***	1.1193*	0.8346	0.9486	3.6362	-0.8724	1.4304*	0.3525	2.5063*	2.0591*
	(0.398)	(0.492)	(1.695)	(1.756)	(0.709)	(0.541)	(0.641)	(0.648)	(0.865)	(0.937)	(2.493)	(2.28)	(0.789)	(0.859)	(1.402)	(1.068)
Observations	104	176	85	85	246	390	227	334	72	72	58	80	143	192	132	132
Groups	38	42	34	34	80	90	76	86	28	28	24	27	50	60	47	47
Instruments	37	35	34	28	37	37	68	66	28	25	34	29	37	33	41	42
AR(1)	-1.75	-3.16	-1.58	-1.11	-1.98	-2.11	-2.31	-2.36	-1.23	-0.94	-1.56	-0.95	-1.62	-1.56	-1.26	-1.21
AR(1) p-value	0.081	0.002	0.113	0.266	0.048	0.035	0.021	0.018	0.22	0.347	0.12	0.344	0.105	0.12	0.207	0.225
AR(2)	-0.09	1.33	-0.46	-0.06	-1.75	-2.38	-1.66	-1.99	1.09	0.32	-0.29	0.69	-1.14	-1.13	-0.96	-0.93
AR(2) p-value	0.932	0.184	0.645	0.952	0.08	0.017	0.098	0.047	0.275	0.747	0.774	0.493	0.253	0.259	0.339	0.354
Sargan Overidentification Test	34.98	29.12	28.21	30.29	37.4	35.2	79.48	71.59	23.79	15.93	33.5	24.79	18.19	25.19	19.43	27.51
Sargan p-value	0.112	0.259	0.08	0.017	0.069	0.107	0.011	0.037	0.125	0.529	0.021	0.074	0.869	0.395	0.818	0.596
Hansen Overidentification Test	29.79	26.81	16.85	15.79	21.56	31.26	53.79	64.01	12.29	13.71	12.49	10.39	22.89	23.76	18.65	25.31
Hansen p-value	0.277	0.365	0.6	0.468	0.713	0.219	0.444	0.123	0.782	0.687	0.863	0.845	0.639	0.475	0.851	0.71

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.19: Money Supply to GDP & Investment to GDP: Dynamic Panel GMM Models with Linear Specification

Model Number	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries				
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio				
Independent Variables																	
1st Lag of Initial Real GDP per Capita	-0.0233	-0.0156	0.0617	0.21*	-0.0907	-0.0919	-0.1698**	-0.1753**	0.0389	0.0823	0.1078	0.0934	0.0334	0.2355*	-0.0143	0.0059	-0.0133
	(0.06)	(0.051)	(0.063)	(0.112)	(0.067)	(0.057)	(0.069)	(0.079)	(0.092)	(0.079)	(0.253)	(0.16)	(0.098)	(0.133)	(0.096)	(0.101)	(0.108)
1st Lag of Investment to GDP Ratio	0.7386***	0.7431***	0.5618***	0.6895***	0.6624***	0.6885***	0.6603***	0.7074***									
	(0.098)	(0.109)	(0.198)	(0.235)	(0.095)	(0.089)	(0.121)	(0.098)									
1st Lag of Private Investment to GDP Ratio									0.8276***	0.7178***	0.6447	0.6978***	0.4906	0.2545	0.3883**	0.5569***	0.6062***
									(0.186)	(0.172)	(0.499)	(0.199)	(0.376)	(0.263)	(0.182)	(0.18)	(0.149)
Money Supply to GDP Ratio	0.0808	0.1244	0.0833		0.1802		0.1933		0.0058		0.0538		0.3134		0.5615*	0.4531**	
	(0.217)	(0.097)	(0.327)		(0.287)		(0.199)		(0.412)		(0.463)		(0.409)		(0.303)	(0.217)	
1st Lag of Money Supply to GDP Ratio	-0.0908		-0.106	-0.3447	-0.0707		-0.0324		0.0512		-0.1714		-0.2092	0.0206	-0.4652	-0.4464*	
	(0.221)		(0.366)	(0.207)	(0.341)		(0.194)		(0.245)		(0.58)		(0.291)	(0.198)	(0.325)	(0.259)	
2nd Lag of Money Supply to GDP Ratio	0.0154		0.0307		-0.0145		-0.0182		-0.0896	0.1004	-0.0252		0.076		0.18	0.1271*	0.1042
	(0.161)		(0.197)		(0.107)		(0.111)		(0.134)	(0.108)	(0.61)		(0.084)		(0.115)	(0.077)	(0.139)
3rd Lag of Money Supply to GDP Ratio	-0.0732		-0.1433		0.0811	0.1441*	0.1355	0.236***	-0.0461		-0.2124	-0.2514	0.0074		-0.0884		
	(0.109)		(0.212)		(0.059)	(0.074)	(0.088)	(0.082)	(0.174)		(0.426)	(0.263)	(0.066)		(0.119)		
1st Lag of Gross Secondary School Enrolment Rate	0.0398	0.0005	0.0808	-0.1983	0.0855	0.1039	0.1532	0.1733	0.0378	0.1676	-0.0278	-0.0861	-0.1083	-0.1284	0.0199	-0.0797	0.0096
	(0.092)	(0.094)	(0.148)	(0.145)	(0.133)	(0.102)	(0.104)	(0.117)	(0.193)	(0.329)	(0.644)	(0.281)	(0.139)	(0.111)	(0.097)	(0.09)	(0.101)
1st Lag of Inflation Rate			-0.2048	-			0.2373	0.1469			-0.2134	-0.1871			-0.138	-0.0175	-0.0504
			(0.196)	0.1339***			(0.252)	(0.205)			(0.201)	(0.144)			(0.211)	(0.199)	(0.109)
1st Lag of Government Consumption to GDP Ratio			-0.3244	0.1592			0.2392*	0.1711*			-0.2477	-0.2044			0.2509	0.3046	0.3587
			(0.286)	(0.251)			(0.127)	(0.1)			(0.454)	(0.331)			(0.25)	(0.188)	(0.265)
1st Lag of FDI to GDP Ratio			-0.0843	-0.0765			0.0038	0.0105			-0.0503	-0.0308			0.043	0.0428	0.0337
			(0.058)	(0.047)			(0.032)	(0.04)			(0.065)	(0.066)			(0.076)	(0.038)	(0.046)
1st Lag of Trade to GDP Ratio			0.0521	0.4872			-0.195	-0.1621*			0.0197	-0.1955			0.0396	0.0545	0.0474
			(0.258)	(0.46)			(0.124)	(0.092)			(0.776)	(0.332)			(0.153)	(0.165)	(0.206)
Constant	0.94*	0.6699**	1.7423	-1.1528	0.7093**	0.8865***	0.8999	0.9509**	0.2343	-0.8206	1.7406	2.2719	0.79*	0.822	0.0351	-0.1505	-0.5529
	(0.531)	(0.318)	(1.23)	(1.667)	(0.297)	(0.317)	(0.579)	(0.462)	(0.495)	(1.132)	(1.881)	(1.341)	(0.416)	(0.577)	(1.054)	(0.78)	(0.923)
Observations	171	213	130	149	378	382	343	347	112	122	89	92	238	268	217	230	232
Groups	43	45	39	42	92	93	87	88	31	32	29	30	67	68	64	65	65
Instruments	42	40	36	30	43	37	73	67	28	30	36	30	42	39	60	58	62
AR(1)	-2.84	-2.81	-1.74	-2	-2.61	-2.48	-2.07	-2.09	-2.32	-1.93	-0.94	-1.73	-1.16	-1.03	-1.53	-2.13	-2.43
AR(1) p-value	0.004	0.005	0.082	0.045	0.009	0.013	0.039	0.037	0.02	0.054	0.348	0.084	0.245	0.302	0.126	0.033	0.015
AR(2)	0.83	0.43	0.62	-0.8	-2.3	-2.18	-2.31	-2.35	1.04	0.8	-0.34	-0.31	-1.25	-1.63	-0.57	-0.74	-0.88
AR(2) p-value	0.406	0.67	0.535	0.424	0.022	0.029	0.021	0.019	0.299	0.422	0.735	0.755	0.212	0.104	0.568	0.46	0.381
Sargan Overidentification Test	40.51	33.7	26.54	10.66	33.28	25.47	52.82	47.29	16.02	18.08	30.39	28.91	28.87	23.37	42.76	38.75	41.48
Sargan p-value	0.076	0.25	0.116	0.83	0.267	0.492	0.596	0.695	0.381	0.582	0.047	0.025	0.472	0.714	0.481	0.614	0.735
Hansen Overidentification Test	29.74	27.06	22.24	8.47	28.24	25.33	61.45	52.28	14.85	12.73	17.01	19.95	21.35	24.29	35.18	30.32	50.66
Hansen p-value	0.427	0.569	0.272	0.934	0.505	0.501	0.287	0.502	0.462	0.889	0.589	0.222	0.846	0.666	0.796	0.91	0.369

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.20: Broad Money Supply to GDP & Investment to GDP: Dynamic Panel GMM Models with Linear Specification

Model Number	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																
1st Lag of Initial Real GDP per Capita	-0.1995	0.4036	-0.2472	-0.0971	-0.0437	-0.1183*	-0.0787*	-0.0901	-5.3278	-0.8883	-0.1309	0.3056	-0.1087	-0.0036	-0.0002	-0.1495
	(0.415)	(0.821)	(0.55)	(0.201)	(0.066)	(0.063)	(0.047)	(0.09)	(6.668)	(2.545)	(0.358)	(0.735)	(0.119)	(0.109)	(0.112)	(0.159)
1st Lag of Investment to GDP Ratio	0.4472	0.2087	0.3014	0.983***	0.3002**	0.6391***	0.4722***	0.508**								
	(0.582)	(0.448)	(0.785)	(0.284)	(0.14)	(0.201)	(0.168)	(0.204)								
1st Lag of Private Investment to GDP Ratio									8.2703	-1.6843	()	0.5755	0.717***	0.3413	0.6706***	0.2178
									(14.195)	(1.498)		(1.129)	(0.175)	(0.324)	(0.194)	(0.313)
Broad Money Supply to GDP Ratio	0.121		-0.5529		0.3459		0.5163***		-3.4893	1.5571	1.3963		-0.1946		0.3078	
	(0.466)		(0.972)		(0.214)		(0.165)		(7.884)	(1.106)	(1.084)		(0.379)		(0.243)	
1st Lag of Broad Money Supply to GDP Ratio	0.0387		-0.5747	-0.4559**	-0.0702		-0.428**		-3.4616		()	-0.7426	0.2247	0.1899	-0.3524	
	(0.738)		(1.954)	(0.189)	(0.252)		(0.195)		(5.148)			(0.497)	(0.316)	(0.118)	(0.327)	
2nd Lag of Broad Money Supply to GDP Ratio		0.5526						0.4201**								0.6331
		(0.728)						(0.203)								(0.456)
3rd Lag of Broad Money Supply to GDP Ratio						0.3516*										
						(0.186)										
1st Lag of Gross Secondary School Enrolment Rate	0.2145	-0.6393	-0.4444	0.0693	0.0934	0.1227	0.168	0.0088	12.2278	0.5649	-0.6193	-0.4097	0.2708*	0.2535**	0.2642*	-0.0166
	(0.675)	(0.692)	(0.374)	(0.146)	(0.137)	(0.136)	(0.116)	(0.136)	(15.303)	(3.687)	(0.501)	(0.928)	(0.16)	(0.128)	(0.15)	(0.305)
1st Lag of Inflation Rate			0.5267	0.1039			-0.5867	-0.0091			1.1939	0.5506			-0.9957	0.5825
			(0.468)	(0.43)			(0.427)	(0.548)			(1.904)	(0.793)			(2.122)	(2.147)
1st Lag of Government Consumption to GDP Ratio			0.9045	0.4652			0.0121	0.314			()	1.2096			0.0816	-0.0717
			(0.684)	(0.536)			(0.122)	(0.277)				(0.81)			(0.211)	(0.363)
1st Lag of FDI to GDP Ratio			0.1927	-0.0101			-0.0747*	-0.0125			0.1999	0.0222			0.014	0.1591
			(0.185)	(0.091)			(0.044)	(0.08)			(0.352)	(0.239)			(0.105)	(0.117)
1st Lag of Trade to GDP Ratio			1.7477	0.1046			-0.1229	-0.5205**			()	0.7872			-0.3606	-0.5447*
			(2.26)	(0.357)			(0.149)	(0.252)				(1.028)			(0.596)	(0.298)
Constant	1.7099	-0.9758	()	0.6161	1.0517**	0.2832	1.7552***	1.7537**	()	1.1971	()	-4.4621	0.3827	0.1536	1.5069	3.2991*
	(3.393)	(2.387)		(1.807)	(0.477)	(0.608)	(0.664)	(0.802)		(5.332)		(6.419)	(0.67)	(0.527)	(1.615)	(1.829)
Observations	66	66	41	50	157	163	124	143	37	40	31	39	96	108	87	90
Groups	19	20	14	21	47	36	44	41	10	11	10	17	30	33	30	27
Instruments	21	18	32	30	43	37	40	38	21	19	31	30	29	31	32	30
AR(1)	-0.64	-0.22	-2.01	-1.29	-1.56	-1.87	-1.82	-1.05	0.1	0.25	-0.73	-1.13	-1.41	-0.84	-1.13	-0.73
AR(1) p-value	0.521	0.828	0.044	0.196	0.12	0.062	0.069	0.292	0.92	0.804	0.466	0.259	0.159	0.403	0.257	0.467
AR(2)	0.12	1.22	-0.36	-0.21	-1.77	-1.24	-0.78	-1.56	0.27	-0.4	-0.12	-0.43	-1.18	-1.22	-0.48	-1.2
AR(2) p-value	0.906	0.223	0.716	0.835	0.076	0.216	0.436	0.119	0.784	0.692	0.903	0.664	0.239	0.222	0.63	0.231
Sargan Overidentification Test	19.06	12.65	37.39	17.88	38.3	27.46	34.03	45.85	12.44	12.56	44.48	22.05	17.51	18.81	18.33	19.53
Sargan p-value	0.025	0.124	0.003	0.331	0.116	0.386	0.107	0.005	0.189	0.128	0	0.142	0.42	0.534	0.368	0.242
Hansen Overidentification Test	9.41	6.43	0	6.09	29.31	22.83	21.18	26.59	0	0	0	3.13	20.52	17.45	15.09	13.88
Hansen p-value	0.401	0.599	1	0.987	0.449	0.642	0.683	0.324	1	1	1	1	0.249	0.624	0.589	0.608

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.21: Credit to Private Sector & Real GDP per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272
Country Group	Natural Resource-Based Countries				Other Countries						Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita				Real GDP per Capita						Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																		
1st Lag of Initial Real GDP per Capita	0.9879***	0.9896***	0.781***	0.9218***	0.9896***	1.0211***	1.0051***	0.9389***	0.9441***	0.9193***	-0.0799	-2.0925	-2.1714	-3.5582	-0.5163	-0.3603	-0.7597	-0.236
	(0.035)	(0.068)	(0.077)	(0.095)	(0.047)	(0.042)	(0.065)	(0.056)	(0.046)	(0.045)	(0.781)	(1.874)	(1.881)	(4.175)	(0.772)	(0.529)	(0.986)	(0.727)
Credit to Private Sector to GDP Ratio	0.0182		0.0126*	0.0083	0.0091**	0.0129***	0.0046*	0.0129***	0.0095***	0.0042**	0.0033	0.2005	0.1126		0.0389		0.1238	
	(0.014)		(0.007)	(0.005)	(0.005)	(0.004)	(0.002)	(0.004)	(0.003)	(0.002)	(0.241)	(0.150)	(0.236)		(0.095)		(0.109)	
1st Lag of Credit to Private Sector to GDP Ratio	-0.0239	0.0153**	-0.0105		-0.0054	-0.0097**		-	-0.0063*		0.1164		-0.0602		-0.0369		-0.1668*	-0.0542
	(0.02)	(0.007)	(0.013)		(0.005)	(0.004)		0.0139***	(0.004)		(0.286)		(0.294)		(0.084)		(0.093)	(0.039)
2nd Lag of Credit to Private Sector to GDP Ratio	0.015		0.0023		-0.0008			0.002			-0.0084		-0.013	-0.1608	0.0307	0.0414	0.0701*	
	(0.011)		(0.007)		(0.003)			(0.002)			(0.128)		(0.122)	(0.258)	(0.03)	(0.042)	(0.038)	
3rd Lag of Credit to Private Sector to GDP Ratio	-0.0139		-0.0057		0.0014			-0.002			-0.1948		-0.0785		0.0127		-0.0097	
	(0.01)		(0.006)		(0.002)			(0.002)			(0.139)		(0.143)		(0.041)		(0.034)	
Credit to Private Sector to GDP Ratio Squared	-0.0001		-0.0001*	-0.0001	0**	-	-	-0.0001**	-0.0001**	-0.0001**	-0.0009	-0.0020	-0.0007		-0.0006		-0.0009	
	(0)		(0)	(0)	(0)	0.0001***	0.0001***	(0)	(0)	(0)	(0.003)	(0.001)	(0.002)		(0)		(0.001)	
1st Lag of Credit to Private Sector to GDP Ratio Squ	0.0002	-0.0002**	0.0002		0	0.0001*		0.0001*	0		-0.0004		0.0005		0.0004		0.001*	0.0003
	(0)	(0)	(0)		(0)	(0)		(0)	(0)		(0.004)		(0.004)		(0)		(0.001)	(0)
2nd Lag of Credit to Private Sector to GDP Ratio Squ	-0.0002		-0.0001		0			0			-0.0005		-0.0001	0.0032	-0.0002	-0.0003	-0.0003	
	(0)		(0)		(0)			(0)			(0.002)		(0.002)	(0.003)	(0)	(0)	(0)	
3rd Lag of Credit to Private Sector to GDP Ratio Squ	0.0002		0.0001		0			0			0.0031		0.0014		0		0.0001	
	(0)		(0)		(0)			(0)			(0.002)		(0.002)		(0)		(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.1118	0.1059	0.1861	-0.0134	0.041	-0.0052	0.0353	0.099	0.0697	0.1215	1.9023	1.7634	1.8729	0.7975	1.8542	1.22	1.9481	1.6111
	(0.085)	(0.164)	(0.121)	(0.127)	(0.084)	(0.068)	(0.092)	(0.078)	(0.068)	(0.077)	(1.688)	(2.334)	(1.599)	(3.344)	(1.792)	(1.118)	(1.276)	(1.006)
1st Lag of Inflation Rate			-0.1516	-0.1503*				-0.0343	-0.1124	-0.1374			-2.6827	0.1507			-1.7942	-0.2035
			(0.123)	(0.077)				(0.164)	(0.091)	(0.084)			(1.98)	(2.088)			(2.2)	(0.934)
1st Lag of Government Consumption to GDP Ratio			-0.033	0.0201				-0.0147	-0.0235	-0.0424			-1.5082	4.5302			0.4256	0.7513
			(0.143)	(0.18)				(0.084)	(0.068)	(0.076)			(3.63)	(6.744)			(1.531)	(1.364)
1st Lag of FDI to GDP Ratio			-0.0098	0.0086				0.0328	0.026	0.0339*			-0.3641	-0.1701			-0.0372	0.101
			(0.023)	(0.028)				(0.023)	(0.022)	(0.018)			(0.651)	(0.759)			(0.359)	(0.387)
1st Lag of Trade to GDP Ratio			0.4987***	0.3476*				0.0451	0.1383*	0.1002			1.8259	10.0614			0.1199	1.233
			(0.145)	(0.181)				(0.068)	(0.076)	(0.084)			(3.834)	(6.564)			(1.249)	(1.187)
Constant	-0.1041	-0.3888	-0.9661	-0.8885	-0.1589	0.4174	-0.0472	0.0822	-0.3398	-0.0601	-3.6804	7.5606	7.1279	-27.318	-2.2562	-2.3352	-0.2872	-8.7884**
	(0.398)	(0.589)	(0.641)	(0.915)	(0.237)	(0.907)	(0.276)	(0.326)	(0.363)	(0.354)	(6.491)	(13.157)	(14.244)	(36.188)	(4.519)	(7.409)	(4.583)	(4.087)
Observations	178	221	131	153	421	500	506	369	397	399	178	228	131	144	421	456	369	401
Groups	44	46	39	42	100	103	103	93	96	96	44	46	39	41	100	101	93	96
Instruments	44	39	42	38	47	45	43	77	73	71	44	41	42	38	47	36	77	69
AR(1)	-0.7	0.22	-1.64	-1.68	-2.06	-1.88	-1.86	-2.54	-1.86	-2.32	-1.21	-1.52	-1.38	-2.31	-2.84	-3.21	-2.85	-3.08
AR(1) p-value	0.483	0.826	0.1	0.094	0.04	0.06	0.063	0.011	0.064	0.021	0.227	0.129	0.167	0.021	0.005	0.001	0.004	0.002
AR(2)	-1.2	-1.33	-0.29	-1.02	-2.6	-2.92	-3.07	-1.62	-2.83	-2.76	0.28	0.4	0.89	0.55	-0.23	-0.01	0.82	-1.02
AR(2) p-value	0.231	0.183	0.775	0.306	0.009	0.004	0.002	0.106	0.005	0.006	0.781	0.691	0.374	0.581	0.822	0.993	0.412	0.309
Sargan Overidentification Test	49.81	63.64	34.77	46.12	55.63	41.4	40.89	171.57	139.59	164.44	14.42	31.47	41.69	37.14	56.18	39.22	121.92	143.97
Sargan p-value	0.007	0	0.041	0.004	0.003	0.08	0.089	0	0	0	0.984	0.392	0.007	0.042	0.003	0.026	0	0
Hansen Overidentification Test	20.24	25.77	23.22	24.55	26.56	21.1	27.44	63.41	62.32	64.01	27.55	34.17	23.91	26.98	34.91	23.53	66.19	63.94
Hansen p-value	0.856	0.586	0.389	0.43	0.646	0.885	0.6	0.261	0.293	0.244	0.489	0.274	0.352	0.305	0.246	0.489	0.189	0.191

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.22: Bank Assets to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita				Real GDP per Capita				Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.904***	0.9943***	0.8873***	0.9415***	0.9416***	1.1079***	0.9656***	0.9082***	-1.8355	-2.8079	-2.8598*	-2.3128	-0.9172	-0.0542	-0.5448	-1.0479
	(0.073)	(0.048)	(0.134)	(0.108)	(0.085)	(0.154)	(0.042)	(0.071)	(1.385)	(2.788)	(1.52)	(1.455)	(0.928)	(0.821)	(0.758)	(0.804)
Bank Assets to GDP Ratio	0.0041	-0.0044	0.0019		0.0007		-0.009**		-0.0788		-0.0677		-0.0473	-0.0886	-0.1488	
	(0.009)	(0.004)	(0.011)		(0.006)		(0.004)		(0.106)		(0.06)		(0.1)	(0.085)	(0.099)	
1st Lag of Bank Assets to GDP Ratio	-0.0273		-0.0143	-0.0087	0.0059		0.0085		0.1729	-0.1125	0.1909		0.0778		0.1535	
	(0.019)		(0.026)	(0.006)	(0.009)		(0.008)		(0.139)	(0.188)	(0.147)		(0.139)		(0.125)	
2nd Lag of Bank Assets to GDP Ratio	0.024		-0.0027		-0.0023		0.0034		-0.1003		-0.0232		-0.0171		-0.0024	-0.0673
	(0.021)		(0.041)		(0.004)		(0.003)		(0.333)		(0.293)		(0.04)		(0.065)	(0.082)
3rd Lag of Bank Assets to GDP Ratio	0.0214		0.0109		0.0043	-0.0065	0.0037	0.005	-0.0242		0.0199	0.4929	0.0482		0.0311	
	(0.02)		(0.023)		(0.004)	(0.007)	(0.003)	(0.006)	(0.314)		(0.498)	(0.358)	(0.045)		(0.049)	
Bank Assets to GDP Ratio Squared	0	0.0001	0		-0.0001		0		0.0001		-0.0001		0.0001	0.0010	0.0013	
	(0)	(0)	(0)		(0)		(0)		(0)		(0)		(0.001)	(0.001)	(0.001)	
1st Lag of Bank Assets to GDP Ratio Squared	0.0001		0	0	0		-0.0001		-0.0004	0.0005	-0.0002		-0.0005		-0.0015	
	(0)		(0)	(0)	(0)		(0)		(0.001)	(0.001)	(0.001)		(0.001)		(0.001)	
2nd Lag of Bank Assets to GDP Ratio Squared	-0.0001		0.0001		0.0001**		0		-0.0002		-0.0021		0.0001		-0.0002	0.0004
	(0)		(0)		(0)		(0)		(0.005)		(0.004)		(0)		(0.001)	(0.001)
3rd Lag of Bank Assets to GDP Ratio Squared	-0.0006		-0.0004		-0.0001*	0	0	-0.0001	0.0012		-0.0001	-0.0096	-0.0006		-0.0003	
	(0)		(0.001)		(0)	(0)	(0)	(0)	(0.005)		(0.007)	(0.006)	(0)		(0.001)	
1st Lag of Gross Secondary School Enrolment Rate	0.2615***	0.1188**	0.2709	0.0691	0.1847	-0.0562	0.0812	0.1485	2.2493	-1.5482	4.0708***	3.8973*	2.2619	2.0746	1.6378	1.9999
	(0.096)	(0.057)	(0.234)	(0.112)	(0.154)	(0.292)	(0.076)	(0.114)	(2.021)	(3.133)	(1.292)	(1.99)	(2.174)	(1.888)	(1.039)	(1.547)
1st Lag of Inflation Rate			0	-0.1605			0.0442	0.1856			-1.5883	-0.123			-1.371	1.7322
			(0.158)	(0.115)			(0.177)	(0.154)			(4.59)	(0.834)			(2.073)	(1.585)
1st Lag of Government Consumption to GDP Ratio			0.1918	0.1872			0.0689	0.0934			0.3934	2.3065			0.5486	1.9219
			(0.213)	(0.125)			(0.076)	(0.082)			(4.803)	(1.853)			(1.055)	(1.309)
1st Lag of FDI to GDP Ratio			0.0088	-0.0005			0.0224	0.0447			-0.6425	-1.189**			0.0547	0.493
			(0.065)	(0.035)			(0.026)	(0.027)			(0.886)	(0.544)			(0.368)	(0.482)
1st Lag of Trade to GDP Ratio			0.2632	0.3673**			0.1317	0.1554			0.8733	2.7336			-0.512	1.5046
			(0.202)	(0.158)			(0.092)	(0.11)			(2.951)	(2.933)			(0.957)	(1.158)
Constant	-0.1588	-0.166	-1.5242	-1.6078**	-0.1604	-0.4677	-0.683*	-0.6599	8.1287	31.3387	5.2849	-12.9759	-0.7509	-5.2796	0.2519	-8.4349**
	(0.435)	(0.491)	(1.136)	(0.772)	(0.317)	(0.333)	(0.407)	(0.426)	(7.561)	(30.04)	(28.89)	(13.78)	(4.689)	(5.301)	(4.376)	(4.234)
Observations	116	199	92	144	276	276	246	246	116	192	92	92	276	420	246	303
Groups	41	44	36	40	88	88	82	82	41	44	36	36	88	93	82	86
Instruments	38	34	40	38	38	26	69	57	38	32	40	34	38	35	69	60
AR(1)	-1.52	-0.12	-0.85	-1.28	-1.61	-1.07	-1.63	-1.56	-2.27	-1.53	-1.89	-1.66	-3.15	-3.18	-2.68	-2.74
AR(1) p-value	0.129	0.902	0.394	0.2	0.107	0.286	0.102	0.119	0.023	0.126	0.059	0.096	0.002	0.001	0.007	0.006
AR(2)	-1.1	-1.35	-0.55	-0.87	-1.27	-1.71	-1.98	-2.3	1.21	0.85	0.63	0.54	0.1	-1.09	-0.92	-0.45
AR(2) p-value	0.273	0.176	0.586	0.382	0.204	0.087	0.048	0.021	0.226	0.396	0.53	0.591	0.922	0.275	0.357	0.653
Sargan Overidentification Test	72.08	69.98	43.21	31.47	61.16	35.68	146.57	135.47	50.03	23.9	45.54	33.48	47.16	32.03	109.93	88.38
Sargan p-value	0	0	0.004	0.141	0	0.008	0	0	0.001	0.352	0.002	0.055	0.003	0.126	0	0
Hansen Overidentification Test	21.86	21.36	17.93	24.91	27.3	22.91	51.9	52.14	24.64	26.04	18.06	20.16	40.31	32.87	55	48.3
Hansen p-value	0.587	0.618	0.71	0.411	0.291	0.194	0.439	0.216	0.426	0.25	0.703	0.573	0.02	0.107	0.326	0.42

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.23: Bank Liabilities to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305
Country Group	Natural Resource-Based Countries					Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita					Real GDP per Capita				Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																	
1st Lag of Initial Real GDP per Capita	0.9839***	0.9708***	0.8421***	0.9189***	0.8252***	0.952***	0.9211***	0.9105***	0.9593***	-2.2554*	-1.3104	-2.1329*	-1.8503	-0.9959	-0.0182	-1.4142	-0.302
	(0.113)	(0.102)	(0.071)	(0.076)	(0.095)	(0.061)	(0.125)	(0.041)	(0.06)	(1.278)	(1.809)	(1.202)	(1.596)	(0.902)	(2)	(0.997)	(0.758)
Bank Liabilities to GDP Ratio	0.0379		0.0133	0.0374***		0.0039		0.0033	-0.0086	0.176		0.4238*	0.1361	0.1694		-0.0894	-0.1290
	(0.026)		(0.011)	(0.011)		(0.008)		(0.008)	(0.005)	(0.299)		(0.22)	(0.325)	(0.15)		(0.133)	(0.097)
1st Lag of Bank Liabilities to GDP Ratio	-0.0718**		-0.0112	-0.0614**		-0.0098		-		-0.0452	-0.2504	-0.4456		-0.229		-0.0509	
	(0.032)		(0.016)	(0.024)		(0.006)		0.0132***		(0.632)	(0.177)	(0.372)		(0.141)		(0.116)	
2nd Lag of Bank Liabilities to GDP Ratio	0.017		0.0233			0.0045		0.003		0.09		0.1137		0.1004**		0.0512	
	(0.032)		(0.027)			(0.003)		(0.003)		(0.587)		(0.415)		(0.049)		(0.037)	
3rd Lag of Bank Liabilities to GDP Ratio	-0.0539	0.0504	-0.0056		0.0199	-0.0012	-0.007	-0.0034		0.2667		-0.0975		-0.0179	-0.1514**	-0.0749**	
	(0.032)	(0.031)	(0.033)		(0.025)	(0.002)	(0.005)	(0.003)		(0.38)		(0.456)		(0.042)	(0.063)	(0.038)	
Bank Liabilities to GDP Ratio Squared	-0.0006*		-0.0001	-		0		0	0.0001	-0.002		-0.0063*	-0.0011	-0.0008		0.0011	0.0006
	(0)		(0)	0.0005***		(0)		(0)	(0)	(0.004)		(0.003)	(0.002)	(0.001)		(0.002)	(0.001)
1st Lag of Bank Liabilities to GDP Ratio Squared	0.002**		0.0003	0.0017***		0		0.0001		0.0034	0.0031	0.0172		0.0013*		0.0003	
	(0.001)		(0)	(0.001)		(0)		(0)		(0.015)	(0.003)	(0.011)		(0.001)		(0.001)	
2nd Lag of Bank Liabilities to GDP Ratio Squared	-0.0011		-0.0019			0		0		-0.0141		-0.0171		-0.0008*		-0.0004	
	(0.002)		(0.001)			(0)		(0)		(0.022)		(0.022)		(0)		(0.001)	
3rd Lag of Bank Liabilities to GDP Ratio Squared	0.003	-0.0027*	-0.0003		-0.0017	0	0.0001	0		-0.0086		0.015		0	0.0009*	0.0006*	
	(0.002)	(0.002)	(0.002)		(0.001)	(0)	(0)	(0)		(0.021)		(0.032)		(0)	(0.001)	(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.1532	0.0082	0.2331***	0.1012	0.2949**	0.2262**	0.2327	0.2959***	0.2092**	2.2835	1.6561	1.0691	-0.6559	2.6045	1.8282	4.4736***	3.1634**
	(0.192)	(0.318)	(0.081)	(0.109)	(0.131)	(0.111)	(0.257)	(0.098)	(0.085)	(1.902)	(2.173)	(1.176)	(3.888)	(1.962)	(4.218)	(1.469)	(1.348)
1st Lag of Inflation Rate			-0.0914	-0.1855**	-0.0279			-0.1064	-			-1.8887	-1.2309			-2.6479	-1.7723
			(0.125)	(0.076)	(0.146)			(0.172)	0.3919***			(2.918)	(0.858)			(3.982)	(1.29)
1st Lag of Government Consumption to GDP Ratio			0.0849	-0.0271	0.1036			0.0578	0.0602			-0.1127	0.1446			0.7731	2.0187
			(0.177)	(0.116)	(0.128)			(0.082)	(0.097)			(2.475)	(3.448)			(1.57)	(1.768)
1st Lag of FDI to GDP Ratio			-0.0227	0.0234	-0.0019			0.0498**	0.0077			-0.552	0.9055			0.5194	-0.1632
			(0.042)	(0.023)	(0.033)			(0.02)	(0.032)			(0.623)	(0.815)			(0.322)	(0.434)
1st Lag of Trade to GDP Ratio			0.201	0.0887	0.3262**			-0.123	0.1645			-0.5048	0.2398			-3.232***	1.0983
			(0.158)	(0.163)	(0.158)			(0.086)	(0.102)			(2.145)	(1.705)			(1.215)	(1.464)
Constant	-0.1839	0.1039	-0.5371	0.1614	-1.2482	-0.3185	-0.08	0.1602	-1.1227**	9.5605	6.129	16.6121	15.6531	-1.1374	-4.5233	8.4281	-
	(0.598)	(0.616)	(0.934)	(0.866)	(0.834)	(0.218)	(0.277)	(0.417)	(0.462)	(5.85)	(15.443)	(13.91)	(20.833)	(4.446)	(4.078)	(6.093)	17.1812**
Observations	110	110	88	139	88	259	261	231	346	110	186	88	141	259	261	231	346
Groups	39	39	34	39	34	83	84	77	87	39	43	34	39	83	84	77	87
Instruments	38	26	40	34	34	38	26	69	65	38	32	40	38	38	26	69	65
AR(1)	-1.64	-0.9	-1.08	-1.38	-0.92	-1.12	-0.91	-1.25	-1.99	-1.98	-1.51	-1.28	-1.71	-2.49	-2.56	-2.45	-2.79
AR(1) p-value	0.101	0.37	0.281	0.167	0.359	0.262	0.361	0.211	0.046	0.047	0.131	0.202	0.087	0.013	0.011	0.014	0.005
AR(2)	-0.99	-1.3	-1.11	-0.92	-1.31	-1.8	-1.78	-1.83	-1.95	1.09	0.76	0.8	0.25	0.45	-0.98	-0.49	-1.73
AR(2) p-value	0.322	0.194	0.265	0.357	0.191	0.071	0.074	0.067	0.052	0.277	0.448	0.424	0.802	0.652	0.329	0.627	0.083
Sargan Overidentification Test	56.92	58.21	41.53	24.36	43.08	45.72	31.15	142.48	115.53	53.08	17.77	27.93	45.92	45.65	34.78	97.77	99.8
Sargan p-value	0	0	0.007	0.144	0.005	0.005	0.028	0	0	0.001	0.719	0.178	0.005	0.005	0.01	0	0
Hansen Overidentification Test	22.9	21.6	12.69	13.83	23.66	24.29	21.71	53	46.11	24.77	23.07	14.33	25.93	30.93	22.58	54.24	56.45
Hansen p-value	0.526	0.25	0.941	0.74	0.365	0.445	0.245	0.397	0.668	0.418	0.398	0.889	0.357	0.156	0.207	0.352	0.279

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.24: Money Supply to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323
Country Group	Natural Resource-Based Countries				Other Countries						Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita				Real GDP per Capita						Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																		
1st Lag of Initial Real GDP per Capita	1.0167***	0.9657***	0.8765***	0.9554***	0.9676***	0.9524***	0.969***	0.9717***	0.8789***	0.9122***	-1.3356	-1.3535	-1.9421**	-0.6829	-0.4191	-0.3008	-1.0453*	-0.9518
	(0.07)	(0.085)	(0.052)	(0.089)	(0.049)	(0.041)	(0.039)	(0.055)	(0.055)	(0.039)	(1.096)	(3.32)	(0.812)	(0.996)	(0.748)	(0.665)	(0.623)	(0.818)
Money Supply to GDP Ratio	0.0076		0.0196*		0.0203***	0.0159***	0.0104***	0.0036**	0.0047		-0.1604		0.1875		0.1811*		0.0301	
	(0.013)		(0.01)		(0.005)	(0.003)	(0.003)	(0.001)	(0.005)		(0.156)		(0.298)		(0.106)		(0.1)	
1st Lag of Money Supply to GDP Ratio	-0.0232		-0.0264	-0.0155	-0.023***	-	-0.0071**		-0.0063		0.3173*		-0.2986	-0.4278	-0.2234*		-0.0254	
	(0.014)		(0.02)	(0.015)	(0.006)	0.0146***	(0.003)		(0.005)		(0.17)		(0.35)	(0.295)	(0.117)		(0.109)	
2nd Lag of Money Supply to GDP Ratio	0.0095	-0.017**	0.0187		0.008**	0.0047*			0.0053*	0.0067***	-0.1091	-0.1789	0.2519**		0.12	0.0441	0.0544	0.098**
	(0.014)	(0.008)	(0.014)		(0.004)	(0.002)			(0.003)	(0.002)	(0.216)	(0.197)	(0.124)		(0.073)	(0.027)	(0.04)	(0.045)
3rd Lag of Money Supply to GDP Ratio	-0.006		-0.0084		0.0003				0.0033		-0.0686		-0.2101		0.0141		0.0608	
	(0.007)		(0.009)		(0.003)				(0.003)		(0.104)		(0.162)		(0.036)		(0.039)	
Money Supply to GDP Ratio Squared	0		-0.0002		-	-	-	-	0		0.0005		-0.0016		-0.0008**		-0.0002	
	(0)		(0)		0.0001***	0.0001***	0.0001***	0.0001***	(0)		(0.001)		(0.003)		(0)		(0.001)	
1st Lag of Money Supply to GDP Ratio Squared	0.0001		0.0002	0.0001	0.0001***	0.0001***	0***		0		-0.0018		0.0018	0.0045	0.0011**		0	
	(0)		(0)	(0)	(0)	(0)	(0)		(0)		(0.001)		(0.004)	(0.003)	(0)		(0.001)	
2nd Lag of Money Supply to GDP Ratio Squared	0	0.0001*	-0.0001		0	0			0	0**	0.0006	0.0018	-0.0012		-0.0007*	0	-0.0003	-0.0007**
	(0)	(0)	(0)		(0)	(0)			(0)	(0)	(0.002)	(0.002)	(0.002)		(0)	(0)	(0)	(0)
3rd Lag of Money Supply to GDP Ratio Squared	0		0		0				0		0.0005		0.0008		0		-0.0004	
	(0)		(0)		(0)				(0)		(0.001)		(0.001)		(0)		(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.0774	0.1969**	0.2288	0.0264	0.051	0.0595	0.0685	0.0845	0.1837*	0.1341*	2.2666	2.5151	3.4669**	-1.2649	1.0388	0.8864	2.3458**	2.3793**
	(0.177)	(0.094)	(0.159)	(0.138)	(0.081)	(0.075)	(0.072)	(0.096)	(0.108)	(0.073)	(2.72)	(2.325)	(1.431)	(2.788)	(1.397)	(1.32)	(0.979)	(1.197)
1st Lag of Inflation Rate			-0.1104	-0.2081**					-0.1732	-0.1845*			-1.5369	-1.1867			-0.0264	1.4353
			(0.066)	(0.087)					(0.192)	(0.109)			(1.288)	(1.092)			(2.412)	(1.635)
1st Lag of Government Consumption to GDP Ratio			0.0144	0.149					-0.0141	-0.0672			1.5017	3.7724			0.0749	-0.0304
			(0.136)	(0.229)					(0.084)	(0.085)			(2.128)	(3.692)			(1.645)	(1.901)
1st Lag of FDI to GDP Ratio			0.0004	0.0181					0.0243	0.0421			0.061	0.8709			-0.1678	-0.3267
			(0.043)	(0.041)					(0.024)	(0.03)			(0.506)	(1.196)			(0.316)	(0.565)
1st Lag of Trade to GDP Ratio			0.4203**	0.3106					0.0517	0.0936			1.7417	0.465			0.079	1.7096
			(0.154)	(0.2)					(0.069)	(0.09)			(3.148)	(4.186)			(0.956)	(1.462)
Constant	-0.1892	-0.0155	-	-1.0795	-0.0376	0.5965	0.4393	0.2504	0.0111	-0.0047	4.2436	6.2897	-5.527	5.0872	-2.497	6.7973	-2.359	-7.9677
	(0.725)	(0.657)	1.5602***	(1.067)	(0.178)	(0.452)	(0.588)	(0.743)	(0.263)	(0.401)	(6.041)	(21.881)	(10.908)	(20.691)	(2.649)	(14.487)	(4.02)	(6.025)
Observations	180	196	133	152	395	432	482	492	347	375	180	196	133	152	395	436	347	375
Groups	44	45	39	42	95	101	103	103	88	95	44	45	39	42	95	101	88	95
Instruments	44	36	42	38	47	46	45	43	77	67	44	36	42	38	47	38	77	67
AR(1)	-0.72	-0.34	-1.68	-1.06	-3.1	-3.05	-1.61	-1.68	-1.99	-2.28	-2.03	-1.31	-2.09	-2.2	-3.01	-3.29	-3.2	-3.21
AR(1) p-value	0.469	0.736	0.093	0.29	0.002	0.002	0.108	0.093	0.047	0.023	0.042	0.191	0.036	0.028	0.003	0.001	0.001	0.001
AR(2)	-1.5	-1.36	-1.13	-0.93	-1.16	-1.34	-2.79	-3.04	-0.7	-2.38	-0.32	0.18	1.1	0.18	0.12	1.18	0.98	0.23
AR(2) p-value	0.135	0.173	0.26	0.354	0.246	0.18	0.005	0.002	0.482	0.017	0.75	0.86	0.272	0.86	0.907	0.236	0.326	0.821
Sargan Overidentification Test	58.73	53.59	35.08	36.77	47.45	34.96	40.41	56.56	177.34	180.67	31.79	23.06	35.36	53.33	58.5	38.49	124.44	121.71
Sargan p-value	0.001	0.001	0.038	0.046	0.022	0.244	0.097	0.002	0	0	0.283	0.629	0.036	0.001	0.001	0.055	0	0
Hansen Overidentification Test	30.78	20.58	21.98	29.93	30.91	21.39	30.38	36.16	64.68	57.4	28.99	26.3	23.12	25.67	36.8	30.31	60.01	63.63
Hansen p-value	0.327	0.763	0.461	0.187	0.42	0.875	0.446	0.203	0.226	0.316	0.413	0.447	0.395	0.37	0.183	0.255	0.367	0.15

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.25: Broad Money Supply to GDP & Real GDP per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340
Country Group	Natural Resource-Based Countries				Other Countries					Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GDP per Capita				Real GDP per Capita					Real GDP per Capita Growth Rate				Real GDP per Capita Growth Rate			
Independent Variables																	
1st Lag of Initial Real GDP per Capita	1.2653***	1.0358***	1.0122***	0.9886***	1.0802***	1.013***	0.9696***	1.0096***	0.9312***	3.6809	0.7698	0.6746	0.1072	1.4236**	1.3857	0.1399	-1.1771
	(0.167)	(0.111)	(0.086)	(0.227)	(0.05)	(0.048)	(0.075)	(0.051)	(0.08)	(2.505)	(3.226)	(2.08)	(2.477)	(0.696)	(1.133)	(0.676)	(1.2)
Broad Money Supply to GDP Ratio	0.0246*		0.0173		0.0114*			0		0.1163	0.1917	-0.279		0.0781		0.0431	
	(0.014)		(0.028)		(0.006)			(0.015)		(0.157)	(0.162)	(0.587)		(0.112)		(0.141)	
1st Lag of Broad Money Supply to GDP Ratio	-0.0086		-0.0163		-0.0003	0.0102*		0.0072		0.131		0.3312		0.1756*	0.2731***	0.1542	
	(0.011)		(0.025)		(0.007)	(0.005)		(0.012)		(0.235)		(0.29)		(0.091)	(0.101)	(0.168)	
2nd Lag of Broad Money Supply to GDP Ratio		0.0437		0.03			0.0179***		0.0217***								0.3548**
		(0.031)		(0.039)			(0.007)		(0.007)								(0.139)
3rd Lag of Broad Money Supply to GDP Ratio													0.4081				
													(0.379)				
Broad Money Supply to GDP Ratio Squared	-0.0001		-0.0001		-0.0001**			0		-0.0002	-0.0008	0.0013		-0.001		-0.0005	
	(0)		(0)		(0)			(0)		(0.001)	(0.001)	(0.004)		(0.001)		(0.001)	
1st Lag of Broad Money Supply to GDP Ratio Squared	0.0001		0.0001		0	-0.0001**		0		0		-0.0031		-0.0009	-0.002***	-0.0009	
	(0)		(0)		(0)	(0)		(0)		(0.002)		(0.002)		(0.001)	(0.001)	(0.001)	
2nd Lag of Broad Money Supply to GDP Ratio Square		-0.0004		-0.0003			-		-								-0.0021**
		(0)		(0)			0.0001***		0.0001***								(0.001)
3rd Lag of Broad Money Supply to GDP Ratio Square													-0.0032				
													(0.003)				
1st Lag of Gross Secondary School Enrolment Rate	-0.4352	-0.1578	-0.1587	-0.1491	-0.0834	0.0494	0.0455	0.098	0.0365	-6.8382**	-1.7275	-1.139	-3.1825*	-2.4361*	-2.7123	0.1853	0.0191
	(0.374)	(0.11)	(0.225)	(0.436)	(0.065)	(0.084)	(0.137)	(0.161)	(0.199)	(2.366)	(4.985)	(2.796)	(1.799)	(1.388)	(2.282)	(1.375)	(1.586)
1st Lag of Inflation Rate				()	0.0652			-0.0053	-0.1455			-0.6018	-2.9918			0.3549	1.4061
					(0.318)			(0.332)	(0.238)			(5.424)	(2.505)			(2.62)	(3.378)
1st Lag of Government Consumption to GDP Ratio			-0.2825	-0.2193				-0.0756	0.0214			-5.7661	-14.3909			-0.9615	-0.6723
			(0.235)	(0.816)				(0.134)	(0.21)			(5.448)	(11.203)			(1.483)	(2.748)
1st Lag of FDI to GDP Ratio			-0.0144	-0.0073				0.0189	0.0266			-1.0151	-1.027**			-0.2082	0.1566
			(0.056)	(0.024)				(0.033)	(0.037)			(1.293)	(0.475)			(0.566)	(0.766)
1st Lag of Trade to GDP Ratio			0.1623	0.2591				-0.0664	-0.0475			2.9696	()			-0.9655	-3.5791
			(0.188)	(0.555)				(0.146)	(0.193)			(4.673)				(1.553)	(2.822)
Constant	-0.3683	-0.897	()	-0.2223	-0.5342*	-0.2995	-0.1381	0.0074	0.0911	0.6572	1.0738	()	27.0538	-7.4512*	-1.3689	0.7343	17.031
	(0.618)	(0.726)		(4.215)	(0.315)	(0.276)	(0.401)	(0.645)	(0.556)	(13.869)	(10.416)		(42.048)	(4.166)	(3.771)	(6.386)	(10.901)
Observations	68	69	42	50	169	193	174	127	145	68	79	42	54	169	193	127	145
Groups	19	21	14	17	51	54	47	45	42	19	24	14	19	51	54	45	42
Instruments	23	18	34	30	45	41	38	42	38	23	23	34	30	45	41	42	38
AR(1)	0.28	-1.16	-1.07	-1.23	-1.29	-1.64	-1.27	-1.17	-0.68	-1.6	-1.89	-1.66	-1.22	-1.85	-2.28	-1.31	-1.35
AR(1) p-value	0.776	0.246	0.286	0.219	0.197	0.1	0.204	0.242	0.499	0.11	0.058	0.097	0.223	0.065	0.023	0.191	0.178
AR(2)	0.15	-0.54	1.36	-0.25	-1.56	-0.12	-1.42	-0.02	-0.98	0.39	0.6	1.79	0.75	-0.83	-0.89	0.36	0.49
AR(2) p-value	0.879	0.588	0.174	0.806	0.12	0.908	0.155	0.982	0.325	0.696	0.547	0.074	0.451	0.407	0.373	0.72	0.626
Sargan Overidentification Test	12.74	11.83	40.87	30.23	45.2	45.55	70.65	79.33	92.52	9.37	15.29	30.39	28.91	38.74	47.58	33.76	43.15
Sargan p-value	0.239	0.159	0.002	0.017	0.037	0.019	0	0	0	0.497	0.226	0.034	0.025	0.132	0.012	0.141	0.01
Hansen Overidentification Test	3.5	5.53	0	2.95	35.96	23.45	26.56	24.25	23.02	0.97	8.88	0	5.13	29.4	31.1	24.93	23.72
Hansen p-value	0.967	0.7	1	1	0.209	0.71	0.433	0.562	0.519	1	0.713	1	0.995	0.497	0.313	0.523	0.478

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.26: Credit to Private Sector to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358
Country Group	Natural Resource-Based Countries				Other Countries					Natural Resource-Based Countries				Other Countries				
Dependent Variable	Real GNI per Capita				Real GNI per Capita					Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate				
Independent Variables																		
1st Lag of Initial Real GNI per Capita	0.8872***	0.8595***	0.8301***	0.7107***	0.9144***	0.9453***	0.939***	0.9685***	0.9744***	0.4099	-3.141	-1.5913	-0.5905	-1.7909*	-2.2337**	-1.7456**	-2.1865**	-1.2903
	(0.102)	(0.105)	(0.143)	(0.152)	(0.052)	(0.098)	(0.034)	(0.036)	(0.051)	(3.78)	(6.708)	(7.112)	(4.728)	(0.98)	(0.889)	(0.768)	(1.05)	(0.931)
Credit to Private Sector to GDP Ratio	0.0237**	0.0130**	0.0197	0.0070	0.0119**	0.0072*	0.0099**	0.0069**		-0.3128		-0.0863	-0.2890	-0.0027		0.0431		
	(0.009)	(0.006)	(0.016)	(0.009)	(0.005)	(0.003)	(0.004)	(0.003)		(0.683)		(0.48)	(0.335)	(0.103)		(0.127)		
1st Lag of Credit to Private Sector to GDP Ratio	-0.0315*		-0.0096		-0.0085		-	-0.0065**	-0.0028	0.1765		-0.029		-0.0201		-0.118	-0.1357**	-0.0995**
	(0.016)		(0.018)		(0.006)		0.0119***	(0.003)	(0.002)	(0.756)		(0.714)		(0.141)		(0.121)	(0.064)	(0.05)
2nd Lag of Credit to Private Sector to GDP Ratio	0.0094		-0.0003		0.0015		0.0013			0.2509		0.193		0.0199		0.0526	0.1302***	
	(0.008)		(0.006)		(0.005)		(0.002)			(0.28)		(0.544)		(0.036)		(0.045)	(0.043)	
3rd Lag of Credit to Private Sector to GDP Ratio	-0.0105		-0.0092		-0.0005		-0.0015			-0.4108	-0.6954	0.0961		0.004	0.0791	-0.0201		
	(0.007)		(0.012)		(0.002)		(0.002)			(0.457)	(0.483)	(0.538)		(0.057)	(0.069)	(0.046)		
Credit to Private Sector to GDP Ratio Squared	-0.0002	-0.0001*	-0.0001	-0.0001	-0.0001**	-	0*	0		0.0015		0.0008	0.0027	-0.0002		-0.0002		
	(0)	(0)	(0)	(0)	(0)	0.0001***	(0)	(0)		(0.006)		(0.006)	(0.003)	(0)		(0.001)		
1st Lag of Credit to Private Sector to GDP Ratio Squ	0.0003		0.0001		0		0.0001**	0	0	-0.0011		0.0001		0.0003		0.0006	0.0007*	0.0008**
	(0)		(0)		(0)		(0)	(0)	(0)	(0.009)		(0.014)		(0.001)		(0.001)	(0)	(0)
2nd Lag of Credit to Private Sector to GDP Ratio Squ	0		0		0		0			-0.0035		-0.0019		-0.0001		-0.0001	-0.0006*	
	(0)		(0)		(0)		(0)			(0.004)		(0.007)		(0)		(0)	(0)	
3rd Lag of Credit to Private Sector to GDP Ratio Squ	0.0001		0.0002		0		0			0.0061	0.0129	-0.0018		0	-0.0005	0.0001		
	(0)		(0)		(0)		(0)			(0.007)	(0.008)	(0.01)		(0)	(0.001)	(0)		
1st Lag of Gross Secondary School Enrolment Rate	0.3422**	0.0422	0.1351	0.3592	0.1463	0.0771	0.1551***	0.0624	0.0895	7.0799	-0.9201	7.0151	1.6809	3.6832**	3.3247**	4.2698***	4.126***	3.6485***
	(0.163)	(0.188)	(0.229)	(0.256)	(0.09)	(0.103)	(0.058)	(0.059)	(0.073)	(8.473)	(14.383)	(9.965)	(12.834)	(1.481)	(1.466)	(1.6)	(1.485)	(1.377)
1st Lag of Inflation Rate			-0.1515	-0.1265			0.0706	-0.0817	-0.1752			-0.3135	-2.6325			-1.242	1.4472	1.0458
			(0.123)	(0.076)			(0.179)	(0.091)	(0.122)			(5.556)	(2.674)			(3.594)	(1.613)	(1.214)
1st Lag of Government Consumption to GDP Ratio			0.0698	-0.123			-0.0227	-0.0539	-0.0144			2.4578	-2.8078			1.1984	2.1955	1.0241
			(0.238)	(0.384)			(0.079)	(0.071)	(0.108)			(9.962)	(5.616)			(1.963)	(1.918)	(2.079)
1st Lag of FDI to GDP Ratio			-0.0065	0.0044			0.0026	0.0136	0.0372			0.298	0.895			-0.2546	0.1311	-0.1658
			(0.033)	(0.035)			(0.024)	(0.025)	(0.037)			(3.262)	(1.939)			(0.563)	(0.517)	(0.579)
1st Lag of Trade to GDP Ratio			0.1339	0.4649***			0.0493	0.1221**	0.1499			-1.1648	-9.7249			-0.8032	0.7136	-0.1053
			(0.319)	(0.156)			(0.087)	(0.057)	(0.092)			(12.862)	(16.731)			(1.052)	(1.359)	(1.173)
Constant	-0.0988	0.8462	0.1108	-0.7997	-0.0182	0.1535	-0.1131	-0.2263	-0.5624	-21.3285	33.7419*	-15.9588	53.2768	0.3933	4.0961	-0.1441	-6.4655	-2.9428
	(0.894)	(0.978)	(1.649)	(0.904)	(0.274)	(0.368)	(0.476)	(0.29)	(0.353)	(29.839)	(18.595)	(100.031)	(83.251)	(5.385)	(3.163)	(5.653)	(5.1)	(5.043)
Observations	122	146	97	110	317	364	287	302	306	122	126	97	110	317	321	287	301	306
Groups	30	31	27	29	80	81	76	77	77	30	30	27	29	80	81	76	77	77
Instruments	30	31	42	30	47	43	72	73	69	30	30	42	30	47	35	72	71	69
AR(1)	-0.52	-0.43	-1.07	-0.48	-1.9	-2.93	-2.44	-2.55	-2.45	-1.45	-1.99	-0.68	-1.42	-2.6	-2.92	-2.52	-2.71	-2.45
AR(1) p-value	0.601	0.67	0.283	0.635	0.057	0.003	0.015	0.011	0.014	0.147	0.046	0.495	0.154	0.009	0.004	0.012	0.007	0.014
AR(2)	-0.84	-1.44	0.99	-0.15	-1.86	-2.51	-2.02	-2.04	-2.1	-0.59	-0.72	0.22	1.57	0.27	0.64	1.44	1.06	0.4
AR(2) p-value	0.399	0.15	0.321	0.883	0.063	0.012	0.044	0.041	0.036	0.553	0.472	0.827	0.115	0.788	0.524	0.151	0.289	0.686
Sargan Overidentification Test	19.4	64.45	31.91	36.43	77.85	66.56	129.08	140.7	139.04	19.18	17.62	20.67	12.57	59.33	47.66	89.49	95.13	100.83
Sargan p-value	0.15	0	0.079	0.003	0	0	0	0	0	0.158	0.612	0.541	0.704	0.001	0.003	0.001	0.001	0
Hansen Overidentification Test	10.1	16.76	7.89	16.94	37.27	37.69	57.51	56.33	56.36	8.26	16.27	1.68	4.84	34.3	27.72	53.21	59.96	55.97
Hansen p-value	0.755	0.669	0.997	0.389	0.169	0.158	0.279	0.5	0.424	0.876	0.7	1	0.996	0.269	0.272	0.427	0.301	0.438

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.27: Bank Assets to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GNI per Capita	0.9276	0.952***	0.8285	0.6713***	0.9542***	1.0026***	0.9969***	0.9733***	1.1988	-9.2785	-4.4181	-7.6715	-1.1479	-1.5105	-0.7444	-2.0388*
	(0.75)	(0.072)	(1.112)	(0.099)	(0.085)	(0.057)	(0.051)	(0.048)	(4.467)	(6.993)	(6.64)	(4.865)	(1.617)	(1.839)	(0.543)	(1.188)
Bank Assets to GDP Ratio	0.0048		0.001		-0.0032	-0.0050	-0.0137**		0.0193	-0.1809	0.0609		-0.093		-0.1712	
	(0.331)		(0.024)		(0.006)	(0.004)	(0.006)		(0.336)	(0.131)	(1.211)		(0.173)		(0.146)	
1st Lag of Bank Assets to GDP Ratio	-0.0148		()	-	0.0069		0.0101	0.0068	-0.2309		()		0.1782		0.1241	0.0488
	(0.358)			0.0055***	(0.008)		(0.01)	(0.005)	(0.735)				(0.16)		(0.177)	(0.078)
2nd Lag of Bank Assets to GDP Ratio	-0.0062		-0.0025		0.0001		0.0067**		0.2483		0.094	1.0338	-0.0298		0.0041	
	(0.489)		(0.062)		(0.003)		(0.003)		(1.264)		(1.627)	(0.765)	(0.124)		(0.07)	
3rd Lag of Bank Assets to GDP Ratio	0.1123	0.1124	()		0.0052		0.0004		-0.0836		-0.1334		0.1571*	0.2943**	0.0441	
	(0.618)	(0.092)			(0.004)		(0.003)		(2.016)		(3.594)		(0.087)	(0.143)	(0.053)	
Bank Assets to GDP Ratio Squared	0		0		0	0	0.0001*		0.0003	0.0008	-0.001		0.0003		0.0014	
	(0.003)		(0)		(0)	(0)	(0)		(0.002)	(0.001)	(0.013)		(0.002)		(0.002)	
1st Lag of Bank Assets to GDP Ratio Squared	0.0001		0	0**	0		-0.0001	-0.0001**	-0.0001		0.0031		-0.0012		-0.0011	-0.001
	(0.009)		(0)	(0)	(0)		(0)	(0)	(0.004)		(0.041)		(0.001)		(0.002)	(0.001)
2nd Lag of Bank Assets to GDP Ratio Squared	0		()		0		-0.0001**		()		-0.0144	-0.0103	0.0001		-0.0001	
	(0.036)				(0)		(0)				(0.175)	(0.007)	(0.001)		(0.001)	
3rd Lag of Bank Assets to GDP Ratio Squared	-0.0051	-0.0055	0.001		-0.0001*		0		0.0354		0.026		-0.0016**	-0.0025**	-0.0005	
	(0.04)	(0.005)	(0.01)		(0)		(0)		(0.108)		(0.16)		(0.001)	(0.001)	(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.2965	0.1411	0.2595	0.4032**	0.0639	0.103	0.0136	0.0836	9.5605	5.848	6.2191	6.6543	2.0123	1.4969	1.9268**	3.9904*
	(1.586)	(0.125)	(0.703)	(0.144)	(0.092)	(0.109)	(0.095)	(0.09)	(12.66)	(11.796)	(17.049)	(8.419)	(1.839)	(2.6)	(0.85)	(2.044)
1st Lag of Inflation Rate			-0.0329	-0.1835*			-0.0388	-0.1535*			-0.725	-2.2153			1.7981	1.5375
			(0.184)	(0.103)			(0.145)	(0.085)			(15.123)	(6.27)			(4.065)	(1.242)
1st Lag of Government Consumption to GDP Ratio			-0.1572	-0.3563			0.0837	0.04			2.6027	-9.2272			1.2754	2.7864**
			(0.687)	(0.255)			(0.105)	(0.083)			(8.99)	(18.023)			(1.338)	(1.397)
1st Lag of FDI to GDP Ratio			-0.0191	0.016			0.0236	0.0493*			-0.1333	3.5742			0.2569	0.4518
			(0.109)	(0.034)			(0.031)	(0.027)			(3.772)	(7.03)			(0.495)	(0.446)
1st Lag of Trade to GDP Ratio			0.2115	0.2733			0.1239	0.0858			0.8945	-16.0581			-0.4312	-1.1666
			(1.792)	(0.34)			(0.102)	(0.073)			(10.303)	(40.442)			(1.281)	(1.286)
Constant	-0.5305	-0.1795	()	0.9076	0.2114	-0.2081	-0.6485	-0.4651	-45.0387	50.7615	()	116.282	3.1932	5.2611	-2.049	1.1604
	(5.279)	(0.406)		(2.132)	(0.312)	(0.313)	(0.449)	(0.382)	(38.969)	(30.305)		(186.232)	(6.982)	(5.849)	(4.509)	(6.621)
Observations	77	77	65	103	203	304	189	265	77	130	65	87	203	203	189	265
Groups	27	27	25	27	70	74	66	70	27	29	25	27	70	70	66	70
Instruments	28	26	40	30	38	35	64	63	28	30	40	29	38	26	64	63
AR(1)	-0.17	-1.19	-0.47	-1.12	-2.42	-2.87	-2.31	-2.55	-1.36	-1.4	-0.59	-1.33	-1.83	-1.81	-1.56	-2.44
AR(1) p-value	0.863	0.233	0.636	0.264	0.015	0.004	0.021	0.011	0.172	0.161	0.555	0.184	0.067	0.071	0.118	0.015
AR(2)	0.05	0.18	-0.41	-0.25	-1.49	-2.46	-1.8	-1.34	0.51	1.22	-0.33	-0.24	0.42	0.71	0.38	1.36
AR(2) p-value	0.962	0.858	0.685	0.805	0.136	0.014	0.072	0.179	0.611	0.224	0.744	0.81	0.675	0.477	0.705	0.175
Sargan Overidentification Test	21.42	21.44	42.79	29.43	44.6	40.14	91.9	96.97	17.55	17.2	16.39	12.03	53.06	41.12	81.69	82.45
Sargan p-value	0.091	0.258	0.005	0.021	0.006	0.021	0	0	0.228	0.64	0.796	0.742	0.001	0.001	0.001	0.002
Hansen Overidentification Test	14.25	15.16	14.24	12.52	20.07	26.87	52.63	48.99	5.74	23.23	2.17	5.85	35.8	26.19	46.55	50.73
Hansen p-value	0.431	0.651	0.893	0.708	0.693	0.311	0.233	0.473	0.973	0.278	1	0.99	0.057	0.095	0.45	0.405

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.28: Bank Liabilities to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GNI per Capita	1.0275***	0.9009***	1.087***	0.718***	0.9349***	0.9758***	0.9661***	0.9724***	-1.8849	-0.3699	-1.7181	-1.7307	-0.2165	-1.2825	0.5768	-1.8211
	(0.115)	(0.187)	(0.297)	(0.162)	(0.041)	(0.107)	(0.059)	(0.051)	(4.99)	(4.332)	(1.845)	(3.388)	(2.24)	(1.315)	(1.446)	(1.218)
Bank Liabilities to GDP Ratio	0.0907		0.0693	0.0189	0.002		-0.0013	-0.0062*	1.5969		0.5451		0.0526	-0.1064**	-0.0857	-
	(0.065)		(0.046)	(0.035)	(0.009)		(0.007)	(0.003)	(2.857)		(1.505)		(0.118)	(0.050)	(0.217)	0.2230***
1st Lag of Bank Liabilities to GDP Ratio	-0.0262		0.0219		-0.0068		-0.0053		0.3325		1.1377		-0.2079		-0.1027	
	(0.037)		(0.039)		(0.008)		(0.006)		(1.752)		(1.285)		(0.163)		(0.164)	
2nd Lag of Bank Liabilities to GDP Ratio	0.0166		-0.0089		0.0035*		0.0034		-1.498		0.5321		0.0963		0.0964*	
	(0.039)		(0.055)		(0.002)		(0.003)		(1.548)		(2.46)		(0.079)		(0.055)	
3rd Lag of Bank Liabilities to GDP Ratio	0.006	-0.0266	0.0227		-0.003	-0.0063*	-0.0016		0.738	2.2048	0.0496	0.8446	-0.0765		-0.05	
	(0.034)	(0.033)	(0.063)		(0.003)	(0.003)	(0.003)		(1.665)	(1.976)	(2.033)	(1.197)	(0.106)		(0.034)	
Bank Liabilities to GDP Ratio Squared	-0.0019		-0.0023	0	0		0	0	-0.0548		-0.0248		-0.0002	0.0010***	0.0012	0.0019***
	(0.002)		(0.002)	(0.001)	(0)		(0)	(0)	(0.085)		(0.075)		(0.001)	(0)	(0.002)	(0.001)
1st Lag of Bank Liabilities to GDP Ratio Squared	0.0002		-0.0015		0		0		-0.0147		-0.0415		0.0014		0.0003	
	(0.001)		(0.002)		(0)		(0)		(0.038)		(0.044)		(0.001)		(0.001)	
2nd Lag of Bank Liabilities to GDP Ratio Squared	-0.0003		0.0016		0		0		0.1267		-0.0188		-0.0006		-0.0009	
	(0.003)		(0.003)		(0)		(0)		(0.119)		(0.12)		(0)		(0.001)	
3rd Lag of Bank Liabilities to GDP Ratio Squared	0.0009	0.0024	-0.001		0	0	0		-0.0186	-0.1464	0.0135	-0.0448	0.0004		0.0004	
	(0.002)	(0.002)	(0.003)		(0)	(0)	(0)		(0.092)	(0.118)	(0.131)	(0.084)	(0.001)		(0)	
1st Lag of Gross Secondary School Enrolment Rate	-0.0144	0.2948	0.4312	0.3804	0.1812***	0.1009	0.106	0.1441	5.0804	9.1193	8.5299	1.3493	2.0449	3.7699	0.4276	4.7601**
	(0.128)	(0.213)	(0.304)	(0.24)	(0.057)	(0.167)	(0.093)	(0.093)	(4.7)	(9.34)	(13.331)	(11.021)	(2.735)	(2.334)	(2.34)	(2.168)
1st Lag of Inflation Rate			0.3527	-0.1511			-0.0956	-0.319***			3.4698	-1.5362			-3.0205	-0.808
			(0.337)	(0.115)			(0.176)	(0.082)			(11.053)	(6.846)			(2.704)	(0.959)
1st Lag of Government Consumption to GDP Ratio			0.5556	-0.2177			0.0614	0.0658			5.7472	5.9331			1.5	3.903*
			(0.573)	(0.364)			(0.106)	(0.104)			(20.927)	(6.011)			(1.698)	(2.24)
1st Lag of FDI to GDP Ratio			0.0179	0.0316			0.0545***	0.0266			1.0299	1.0914			0.1446	0.4643
			(0.053)	(0.067)			(0.019)	(0.022)			(1.985)	(2.592)			(0.573)	(0.435)
1st Lag of Trade to GDP Ratio			0.7787	0.2211			0.0133	0.1301			4.9884	7.4479			0.6433	-0.4093
			(0.465)	(0.323)			(0.082)	(0.173)			(17.384)	(10.891)			(2.294)	(1.923)
Constant	-0.1686	-0.1047	-7.0805	0.3699	0.0075	0.0019	-0.202	-0.889	-8.4021	-35.1986	-62.1657	-39.1298	-3.9197	-2.5602	-10.6042	-10.0949
	(0.816)	(1.219)	(6.036)	(2.199)	(0.231)	(0.257)	(0.388)	(0.694)	(43.362)	(47.119)	(160.884)	(35.658)	(9.083)	(4.413)	(13.367)	(10.94)
Observations	73	73	62	99	194	194	180	263	73	73	62	62	194	298	180	263
Groups	26	26	24	26	66	66	62	70	26	26	24	24	66	74	62	70
Instruments	28	26	40	30	38	26	58	65	28	24	40	28	38	35	58	65
AR(1)	-1.41	-1.53	-0.59	-0.72	-1.36	-1.97	-2.13	-2.55	-1.11	-1.57	-0.98	-0.91	-2.14	-2.54	-1.75	-2.3
AR(1) p-value	0.158	0.125	0.555	0.473	0.174	0.049	0.033	0.011	0.267	0.116	0.328	0.364	0.032	0.011	0.08	0.021
AR(2)	-0.32	-0.36	-0.68	-0.69	-1.58	-1.72	-1.77	-1.46	0.35	0.77	0.22	0.74	1.11	0.45	0.94	1.24
AR(2) p-value	0.746	0.722	0.494	0.492	0.115	0.086	0.076	0.145	0.729	0.442	0.824	0.459	0.266	0.651	0.349	0.215
Sargan Overidentification Test	34.56	57.69	37.02	34.15	49.31	31.14	103.13	116.69	14.66	26.71	23.84	16.55	46.39	46.21	72.16	81.82
Sargan p-value	0.002	0	0.024	0.005	0.002	0.028	0	0	0.402	0.045	0.356	0.416	0.004	0.004	0.001	0.004
Hansen Overidentification Test	12.84	20.49	6.52	13.02	22.15	15.74	37.04	54.63	5.02	10.02	2.13	5.41	35.9	24.58	41.28	51.73
Hansen p-value	0.539	0.306	0.999	0.671	0.57	0.611	0.604	0.338	0.986	0.865	1	0.993	0.056	0.429	0.415	0.445

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.29: Money Supply to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries				
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate				
Independent Variables																	
1st Lag of Initial Real GNI per Capita	0.9291***	0.9846***	0.9548***	0.7665***	0.8791***	0.9415***	0.9318***	0.9564***	-2.1862	-1.7401	-0.7646	1.0053	-1.3895*	-0.8558	-1.7998*	-	-1.7552**
	(0.118)	(0.101)	(0.06)	(0.117)	(0.049)	(0.053)	(0.042)	(0.048)	(2.481)	(4.862)	(7.055)	(5.873)	(0.746)	(1.023)	(0.956)	1.8944***	(0.756)
Money Supply to GDP Ratio	0.0086		0.0285	0.0219	0.0142***		0.0001		-0.0781		0.3086	-0.4986	0.0278			-0.028	
	(0.013)		(0.025)	(0.016)	(0.005)		(0.004)		(0.219)		(1.152)	(0.684)	(0.097)			(0.096)	
1st Lag of Money Supply to GDP Ratio	-0.0105		-0.026		-		-0.0008		0.1842	-0.4225	-1.0818		-0.0892	-0.2338**		0.0119	
	(0.018)		(0.031)		0.0201***		(0.006)		(0.347)	(0.432)	(1.62)		(0.116)	(0.091)		(0.119)	
2nd Lag of Money Supply to GDP Ratio	0.0158	-0.009	0.0058		0.0098***		0.0022		0.1631		0.9454		0.0788	0.327***	0.0796**	0.0385	
	(0.015)	(0.013)	(0.018)		(0.003)		(0.003)		(0.272)		(0.965)		(0.076)	(0.091)	(0.033)	(0.054)	
3rd Lag of Money Supply to GDP Ratio	-0.0132		-0.0108		0.0005	0.0145**	0.0042	0.0081*	-0.4226		-0.6243		0.0672			0.0763	0.2135**
	(0.012)		(0.012)		(0.003)	(0.006)	(0.004)	(0.005)	(0.335)		(0.902)		(0.054)			(0.061)	(0.086)
Money Supply to GDP Ratio Squared	0		-0.0002	-0.0002	0**		0		0.0008		-0.0002	0.0051	0.0001			0.0004	
	(0)		(0)	(0)	(0)		(0)		(0.002)		(0.013)	(0.008)	(0)			(0.001)	
1st Lag of Money Supply to GDP Ratio Squared	-0.0001		0.0002		0.0001***		0		-0.0027	0.0046	0.0064		0.0003	0.001**		-0.0003	
	(0)		(0)		(0)		(0)		(0.003)	(0.005)	(0.014)		(0.001)	(0)		(0.001)	
2nd Lag of Money Supply to GDP Ratio Squared	-0.0001	0.0001	0		0**		0		-0.0003		-0.0064		-0.0004	-	-0.0002*	-0.0003	
	(0)	(0)	(0)		(0)		(0)		(0.002)		(0.011)		(0)	0.0016***	(0)	(0)	
3rd Lag of Money Supply to GDP Ratio Squared	0.0001		0.0001		0	-0.0001**	0	-0.0001*	0.0036		0.0044		-0.0006			-0.0005	-
	(0)		(0)		(0)	(0)	(0)	(0)	(0.005)		(0.006)		(0)			(0)	0.0017***
1st Lag of Gross Secondary School Enrolment Rate	0.5297	0.0952	0.1478	0.2543	0.2257**	0.1128	0.1326*	0.0623	7.1099	-5.7948	3.4656	1.5606	2.4621*	3.0245*	3.1605**	3.3926***	2.1625
	(0.345)	(0.157)	(0.193)	(0.182)	(0.087)	(0.088)	(0.079)	(0.083)	(7.709)	(8.679)	(13.073)	(9.141)	(1.271)	(1.555)	(1.358)	(1.106)	(1.385)
1st Lag of Inflation Rate			-0.0415	-0.0071			-0.0272	-0.0991			-4.0638	-1.969				1.2795	2.2721
			(0.11)	(0.058)			(0.084)	(0.19)			(6.657)	(3.312)				(3.735)	(3.953)
1st Lag of Government Consumption to GDP Ratio			0.0993	-0.1953			-0.0367	-0.0044			8.6955	4.5619				0.6699	1.2213
			(0.327)	(0.231)			(0.086)	(0.104)			(28.594)	(8.539)				(1.624)	(1.774)
1st Lag of FDI to GDP Ratio			-0.0025	-0.0035			0.0068	-0.0017			-0.7036	-0.2418				-0.2007	-0.2786
			(0.034)	(0.027)			(0.021)	(0.034)			(2.247)	(1.455)				(0.628)	(0.549)
1st Lag of Trade to GDP Ratio			0.5062	0.6196***			0.1086	0.2064**			0.7058	1.4693				-0.0295	1.2449
			(0.458)	(0.144)			(0.078)	(0.089)			(21.166)	(15.205)				(0.972)	(1.394)
Constant	-1.2138	0.1842	-2.5006	-1.5647**	0.0605	-0.1255	-0.3214	-0.7784**	-5.9963	38.2375	-22.0336	-19.3737	-0.111	-7.4746	-0.0816	-0.7219	-6.4599
	(1.08)	(0.506)	(2.46)	(0.736)	(0.189)	(0.264)	(0.432)	(0.38)	(24.321)	(55.916)	(87.948)	(53.137)	(3.747)	(10.122)	(4.804)	(5.115)	(4.346)
Observations	124	133	99	110	293	297	267	271	124	146	99	110	293	317	317	267	271
Groups	30	31	27	29	75	76	71	72	30	31	27	29	75	81	81	71	72
Instruments	30	30	42	30	47	35	66	65	30	31	42	30	47	42	38	66	60
AR(1)	0.16	-1.52	-0.59	-1.01	-2.55	-2.41	-1.9	-1.76	-1.93	-1.67	-1.21	-1.52	-2.92	-3.05	-2.96	-2.69	-2.74
AR(1) p-value	0.876	0.127	0.558	0.312	0.011	0.016	0.057	0.079	0.054	0.096	0.226	0.129	0.003	0.002	0.003	0.007	0.006
AR(2)	-1.05	-1.83	0.25	0.01	-0.98	-2.16	-0.96	-2.5	0.79	0.28	-0.14	1.21	1.08	0.94	0.97	1.29	1.37
AR(2) p-value	0.295	0.067	0.801	0.994	0.33	0.031	0.338	0.012	0.431	0.778	0.891	0.226	0.28	0.346	0.334	0.198	0.169
Sargan Overidentification Test	23.47	60.66	60.76	44.12	72.97	51	131.62	122.22	27.96	22.41	19.97	16.97	59.86	51.39	53.91	80.78	77.61
Sargan p-value	0.053	0	0	0	0	0.001	0	0	0.014	0.318	0.585	0.387	0.001	0.005	0.001	0.001	0.002
Hansen Overidentification Test	16.07	22.84	5.13	18.59	33.77	29.74	49.12	56.91	5.03	13.97	3.86	6.3	40.32	28.82	35.9	48.34	50.2
Hansen p-value	0.309	0.297	1	0.29	0.29	0.193	0.349	0.265	0.985	0.832	1	0.985	0.099	0.422	0.094	0.379	0.311

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.30: Broad Money Supply to GDP & Real GNI per Capita: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Real GNI per Capita				Real GNI per Capita				Real GNI per Capita Growth Rate				Real GNI per Capita Growth Rate			
Independent Variables																
1st Lag of Initial Real GNI per Capita	1.3918	1.0308***	1.23***	0.2862	1.0705***	1.0426***	0.9994***	1.011***	11.0301	0.3826	-7.8349	2.5226	0.6224	1.422	-0.12	-0.2656
	(0.802)	(0.135)	(0.245)	(0.801)	(0.053)	(0.125)	(0.051)	(0.075)	(12.077)	(4.256)	(5.541)	(8.038)	(0.866)	(1.901)	(0.661)	(1.673)
Broad Money Supply to GDP Ratio	0.0552	0.0311	0.0251	-0.0326	0.0087		0.0045		1.7729		-0.1639		-0.2398		-0.0162	
	(0.079)	(0.043)	(0.057)	(0.032)	(0.012)		(0.011)		(1.226)		(0.576)		(0.268)		(0.159)	
1st Lag of Broad Money Supply to GDP Ratio	0.0079		-0.1078		-0.0003		-0.0006		1.5498		0.4523		0.5325**	0.3215***	0.1645	
	(0.037)		(0.122)		(0.01)		(0.009)		(1.692)		(0.765)		(0.265)	(0.072)	(0.204)	
2nd Lag of Broad Money Supply to GDP Ratio						0.0246*		0.02***				-0.4803				0.3519**
						(0.014)		(0.008)				(0.336)				(0.143)
3rd Lag of Broad Money Supply to GDP Ratio										-0.7994						
										(0.578)						
Broad Money Supply to GDP Ratio Squared	-0.0005	-0.0003	0.0001	0.0004	-0.0001		0		-0.0198		-0.0012		0.001		0.0001	
	(0.001)	(0.001)	(0)	(0)	(0)		(0)		(0.014)		(0.003)		(0.002)		(0.001)	
1st Lag of Broad Money Supply to GDP Ratio Square	-0.0002		0.0007		0		0		-0.0137		-0.0015		-0.003*	-	-0.0014	
	(0)		(0.001)		(0)		(0)		(0.016)		(0.005)		(0.002)	0.0022***	(0.001)	
2nd Lag of Broad Money Supply to GDP Ratio Squar						-0.0002*		-				0.0043				-0.0024**
						(0)		0.0001***				(0.003)				(0.001)
3rd Lag of Broad Money Supply to GDP Ratio Square										0.0064						
										(0.005)						
1st Lag of Gross Secondary School Enrolment Rate	-0.6394	-0.1228	()	1.7728	-0.1149	-0.1914	0.1317	-0.0751	-26.704	9.8357	()	7.3625	-1.913	-3.6784	1.24	-0.4945
	(1.549)	(0.345)		(1.581)	(0.115)	(0.298)	(0.094)	(0.13)	(24.718)	(15.977)		(16.05)	(1.44)	(3.003)	(1.587)	(3.374)
1st Lag of Inflation Rate			()	-0.1901			0.1026	1.4201*			()	-6.3464			-2.8627	26.972**
				(0.273)			(0.408)	(0.854)				(13.684)			(2.42)	(13.107)
1st Lag of Government Consumption to GDP Ratio			()	-1.6169			-0.0645	0.0206			()	()			-0.875	0.7125
				(1.697)			(0.17)	(0.167)							(2.561)	(4.296)
1st Lag of FDI to GDP Ratio			-0.0406	-0.2341			-0.0512	-0.0321			1.2087	-0.331			-0.6936	-0.755
			(0.103)	(0.212)			(0.037)	(0.055)			(0.967)	(0.935)			(1.214)	(0.958)
1st Lag of Trade to GDP Ratio			()	1.1503			-0.0178	-0.0608			14.4153	-6.7739			-0.2898	-1.7743
				(1.213)			(0.137)	(0.165)			(10.243)	(22.765)			(1.933)	(2.482)
Constant	-0.8095	-0.0164	()	()	-0.0918	-0.0906	-0.1063	-0.0324	-10.9194	-16.5162	()	()	0.0022	-3.2222	-1.4458	0.5887
	(0.813)	(0.908)			(0.179)	(0.289)	(0.638)	(0.623)	(21.788)	(14.378)			(2.691)	(4.087)	(7.614)	(6.877)
Observations	46	55	30	37	131	139	108	124	46	47	30	34	131	150	108	124
Groups	14	17	10	13	40	37	38	35	14	15	10	12	40	42	38	35
Instruments	23	19	30	30	37	36	34	30	23	18	30	30	37	37	34	30
AR(1)	-0.86	0.14	-0.1	-0.51	-1.38	-1.36	-1.2	-1.56		-0.49	-1.02		-1.7	-1.97	-1.92	-1.73
AR(1) p-value	0.39	0.885	0.92	0.613	0.168	0.173	0.229	0.118		0.624	0.308		0.09	0.049	0.055	0.083
AR(2)	0.07	-0.7	1.13		-1.08	-1.28	0.14	-1.41	-0.74	0.64	0.87		-0.09	-0.31	1.81	0.81
AR(2) p-value	0.945	0.483	0.258		0.281	0.2	0.885	0.157	0.459	0.522	0.384		0.929	0.758	0.07	0.42
Sargan Overidentification Test	9.58	7.12	28.12	42.85	46.47	36.7	39.75	23.86	4.54	7.35	51.59	60.56	23.5	28.22	21.15	16.72
Sargan p-value	0.478	0.524	0.014	0	0.002	0.047	0.002	0.093	0.92	0.499	0	0	0.374	0.251	0.272	0.404
Hansen Overidentification Test	0.74	5.65	0	0	23.62	24.53	12.85	9.88	0.25	4.85	0	0	16.31	19.05	16.93	13.07
Hansen p-value	1	0.687	1	1	0.367	0.432	0.8	0.873	1	0.773	1	1	0.8	0.749	0.528	0.667

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.31: Credit to Private Sector to GDP & Investment to GDP: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.0013	0.0022	0.1097	0.0731	-0.0751	0.0127	-0.1279*	-0.0753	0.1073	0.1131	0.1944	0.1032	-0.0983	0.0173	-0.0513	0.0237
	(0.031)	(0.068)	(0.094)	(0.168)	(0.046)	(0.095)	(0.069)	(0.059)	(0.127)	(0.083)	(0.39)	(0.186)	(0.077)	(0.075)	(0.073)	(0.079)
1st Lag of Investment to GDP Ratio	0.7344***	0.7387***	0.5589	0.6541***	0.6968***	0.4342***	0.7169***	0.598***								
	(0.104)	(0.122)	(0.386)	(0.207)	(0.101)	(0.116)	(0.099)	(0.089)								
1st Lag of Private Investment to GDP Ratio									0.5944***	0.432***	0.7643***	0.1672	0.5469***	0.4369***	0.5667***	0.6103***
									(0.206)	(0.14)	(0.197)	(0.36)	(0.183)	(0.125)	(0.15)	(0.141)
Credit to Private Sector to GDP Ratio	0.0044		0.0088		0.0013	0.0054	0.0099	0.0062	-0.0204	-0.0518**	0.0053	-0.0248	0.0054	0.0151*	0.0101	0.0108*
	(0.011)		(0.016)		(0.008)	(0.004)	(0.008)	(0.005)	(0.027)	(0.022)	(0.032)	(0.021)	(0.01)	(0.008)	(0.012)	(0.005)
1st Lag of Credit to Private Sector to GDP Ratio	-0.0105		-0.0083		0.0003		-0.0094		-0.0096		-0.0482		0.0094		-0.0052	
	(0.014)		(0.021)		(0.008)		(0.008)		(0.021)		(0.055)		(0.008)		(0.008)	
2nd Lag of Credit to Private Sector to GDP Ratio	0.0066	0.0049	-0.001	-0.0065	-0.0005		0.0011		-0.0013		-0.0243		-0.0054		0.0003	
	(0.01)	(0.007)	(0.014)	(0.013)	(0.003)		(0.004)		(0.022)		(0.049)		(0.004)		(0.006)	
3rd Lag of Credit to Private Sector to GDP Ratio	-0.0034		0.0016		0.0038*		0.0018		-0.0116		-0.0108		0.0057**		0.0014	
	(0.009)		(0.013)		(0.002)		(0.004)		(0.02)		(0.032)		(0.003)		(0.004)	
Credit to Private Sector to GDP Ratio Squared	-0.0001		0		0	0	0	0	0.0002	0.0008**	0	0.0003	0	-0.0001*	0	-0.0001**
	(0)		(0)		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
1st Lag of Credit to Private Sector to GDP Ratio Squ	0.0001		0		0		0		0.0002		0.0006		-0.0001		-0.0001	
	(0)		(0)		(0)		(0)		(0)		(0.001)		(0)		(0)	
2nd Lag of Credit to Private Sector to GDP Ratio Squ	-0.0001	-0.0001	0	0	0		0		0.0001		0.0005		0		0	
	(0)	(0)	(0)	(0)	(0)		(0)		(0)		(0)		(0)		(0)	
3rd Lag of Credit to Private Sector to GDP Ratio Squ	0		0		0*		0		0.0001		0		0		0	
	(0)		(0)		(0)		(0)		(0)		(0)		(0)		(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.0876	0.0847	-0.0042	-0.002	0.1166	-0.0173	0.1257	0.037	0.1356	0.5785*	0.0845	0.3666	0.0609	0.042	0.0485	-0.0609
	(0.072)	(0.115)	(0.144)	(0.23)	(0.09)	(0.091)	(0.096)	(0.064)	(0.133)	(0.299)	(0.309)	(0.364)	(0.11)	(0.081)	(0.2)	(0.106)
1st Lag of Inflation Rate			-0.2077	-0.0543			-0.337**	0.0516			-0.1291	-0.0032			-0.2056	0.0459
			(0.147)	(0.138)			(0.133)	(0.134)			(0.149)	(0.171)			(0.289)	(0.184)
1st Lag of Government Consumption to GDP Ratio			-0.4277	0.0772			0.2238**	0.2125**			0.0519	-0.4044			0.1671	0.2451
			(0.323)	(0.358)			(0.103)	(0.099)			(0.306)	(0.629)			(0.151)	(0.17)
1st Lag of FDI to GDP Ratio			-0.0502	-0.0756			-0.0006	0.0207			0.097	0.0556			0.0233	0.0476
			(0.049)	(0.054)			(0.032)	(0.037)			(0.067)	(0.052)			(0.038)	(0.065)
1st Lag of Trade to GDP Ratio			-0.1028	0.4455			-0.2352**	-0.1712			-0.8775	0.2314			-0.0622	-0.0123
			(0.337)	(0.431)			(0.116)	(0.147)			(0.539)	(0.543)			(0.183)	(0.341)
Constant	0.4942	0.4996	2.1241	-1.3177	1.0087**	2.152***	1.6597**	1.6201**	0.2759	0.7455	3.2204	0.7327	1.3467**	0.7896	0.9908	0.3114
	(0.406)	(0.635)	(1.769)	(2.635)	(0.396)	(0.811)	(0.658)	(0.703)	(1.117)	(1.709)	(3.693)	(1.792)	(0.631)	(0.604)	(0.779)	(1.551)
Observations	169	183	128	141	404	482	365	395	112	128	89	102	237	269	216	238
Groups	43	44	39	41	97	100	92	95	31	32	29	30	67	68	64	65
Instruments	43	41	45	33	55	51	85	79	33	32	45	33	54	49	63	60
AR(1)	-3.01	-3.01	-2.01	-2.25	-2.68	-2.12	-2.26	-2.22	-2.03	-0.68	-1.35	0.52	-2.02	-2.36	-2.32	-2.41
AR(1) p-value	0.003	0.003	0.044	0.025	0.007	0.034	0.024	0.027	0.043	0.498	0.178	0.601	0.043	0.018	0.02	0.016
AR(2)	0.92	0.66	0.9	-0.17	-2.02	-2.75	-1.97	-2.69	1	-0.06	0.24	-0.71	-1.05	-1.43	-0.42	-0.75
AR(2) p-value	0.357	0.511	0.367	0.862	0.044	0.006	0.049	0.007	0.32	0.951	0.811	0.48	0.294	0.154	0.677	0.454
Sargan Overidentification Test	33.69	33.04	38.06	17.66	31.8	32.22	64.8	68.66	15.28	10.76	40.78	41.08	18.81	24.53	31.02	34.91
Sargan p-value	0.143	0.321	0.034	0.478	0.711	0.693	0.448	0.323	0.504	0.952	0.018	0.001	0.994	0.942	0.894	0.861
Hansen Overidentification Test	29.25	30	23.55	15.63	31.62	36.7	70.19	74.12	18.1	12.95	11.57	14.54	27.77	29.1	36	37.48
Hansen p-value	0.3	0.466	0.488	0.618	0.719	0.483	0.278	0.182	0.318	0.88	0.984	0.693	0.864	0.82	0.731	0.779

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.32: Bank Assets to GDP & Investment to GDP: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.0397	-0.0211	0.0044	-0.0065	-0.0394	0.0132	0.0197	-0.188**	0.0015	-0.0157	0.3443	0.0262	0.0579	-0.032	0.0547	-0.0521
	(0.059)	(0.079)	(0.129)	(0.097)	(0.083)	(0.11)	(0.077)	(0.091)	(0.124)	(0.05)	(0.396)	(0.242)	(0.105)	(0.092)	(0.119)	(0.123)
1st Lag of Investment to GDP Ratio	0.5991***	0.7233***	0.7211*	0.7052**	0.6943***	0.6727***	0.5253***	0.6613***								
	(0.117)	(0.105)	(0.377)	(0.281)	(0.099)	(0.109)	(0.158)	(0.12)								
1st Lag of Private Investment to GDP Ratio									0.5576*	0.8179***	0.6325	0.6154*	0.7028***	0.6734***	0.7587***	0.373*
									(0.321)	(0.09)	(0.57)	(0.348)	(0.149)	(0.22)	(0.216)	(0.198)
Bank Assets to GDP Ratio	0.0006		0.0027		0.0001		0.0022		0.036		0.0105		-0.0103		-0.0054	
	(0.005)		(0.006)		(0.011)		(0.012)		(0.051)		(0.014)		(0.016)		(0.015)	
1st Lag of Bank Assets to GDP Ratio	-0.0118	-0.0106	-0.0083		0.0096		-0.0006		-0.0434**	-	-0.0136	-	0.0078		-0.0111	
	(0.014)	(0.008)	(0.022)		(0.014)		(0.01)		(0.016)	0.0108***	(0.067)	0.0171***	(0.018)		(0.014)	
										(0.002)		(0.004)				
2nd Lag of Bank Assets to GDP Ratio	-0.0165		-0.0073		-0.0059		0.0029		-0.0245		()		-0.0058		0.0147	0.0288
	(0.024)		(0.021)		(0.006)		(0.007)		(0.087)				(0.015)		(0.023)	(0.021)
3rd Lag of Bank Assets to GDP Ratio	-0.0104		-0.0013	0.0446	0.0067	0.0087	0.0022	0.0121	-0.0141		0.1988		-0.0061	0.0085	-0.0136	
	(0.016)		(0.017)	(0.06)	(0.006)	(0.007)	(0.004)	(0.008)	(0.076)		(0.211)		(0.01)	(0.008)	(0.017)	
Bank Assets to GDP Ratio Squared	0		0		0		0		-0.0003		0		0		-0.0001	
	(0)		(0)		(0)		(0)		(0.001)		(0)		(0)		(0)	
1st Lag of Bank Assets to GDP Ratio Squared	0	0	0		-0.0001		0		0.0013	0.0001***	0.0001	0.0001***	0.0002		0.0004*	
	(0)	(0)	(0)		(0)		(0)		(0.002)	(0)	(0)	(0)	(0)		(0)	
2nd Lag of Bank Assets to GDP Ratio Squared	0.0003		0.0002		0.0001		0		-0.0044		()		-0.0001		-0.0005	-0.0005
	(0)		(0)		(0)		(0)		(0.008)				(0)		(0)	(0)
3rd Lag of Bank Assets to GDP Ratio Squared	0.0002		0.0001	-0.0006	-0.0001	-0.0001**	0	-0.0001	0.0032		-0.0079		0.0001	-0.0001	0.0004	
	(0)		(0)	(0.001)	(0)	(0)	(0)	(0)	(0.004)		(0.01)		(0)	(0)	(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.1004	-0.0599	0.0193	-0.1287	0.0615	-0.0495	-0.0931	0.1593	-0.0526	0.1446*	-0.1814	0.3716	-0.0731	-0.0251	-0.0726	-0.0004
	(0.121)	(0.133)	(0.136)	(0.218)	(0.143)	(0.193)	(0.12)	(0.133)	(0.12)	(0.078)	(0.444)	(0.251)	(0.153)	(0.133)	(0.14)	(0.199)
1st Lag of Inflation Rate			0.0338	-0.1631			-0.0228	0.028			0.1724	-0.2349			-0.2691	0.0341
			(0.177)	(0.298)			(0.211)	(0.246)			(0.356)	(0.216)			(0.483)	(0.253)
1st Lag of Government Consumption to GDP Ratio			-0.0969	-0.3434			0.1032	0.1359			0.3016	-0.6598**			0.1754	0.5273**
			(0.162)	(0.326)			(0.098)	(0.116)			(0.428)	(0.268)			(0.202)	(0.263)
1st Lag of FDI to GDP Ratio			-0.0462	-0.0813			-0.001	0.0364			0.1043	0.0358			-0.0099	0.1394**
			(0.052)	(0.094)			(0.042)	(0.06)			(0.291)	(0.112)			(0.086)	(0.058)
1st Lag of Trade to GDP Ratio			-0.0391	-0.1439			0.0893	-0.0112			-0.4661	-0.1645			-0.0471	0.1514
			(0.233)	(0.27)			(0.121)	(0.117)			(0.865)	(0.475)			(0.27)	(0.361)
Constant	0.8191	1.0684	1.3917	2.9371**	0.938**	1.0431**	0.9634	1.4472**	1.3691	0.1586	()	1.9579	0.756	1.1573*	0.4567	-0.0401
	(0.663)	(0.753)	(1.125)	(1.384)	(0.409)	(0.407)	(0.599)	(0.679)	(1.861)	(0.431)		(1.564)	(0.549)	(0.695)	(0.759)	(1.559)
Observations	110	182	89	89	263	263	242	242	75	122	61	98	156	156	143	183
Groups	40	43	36	36	85	85	81	81	29	31	25	29	55	55	52	58
Instruments	37	40	43	31	46	34	77	65	31	31	43	33	46	34	50	55
AR(1)	-1.59	-3.02	-1.13	-1.08	-1.68	-1.63	-1.35	-1.81	-0.94	-2.25	-0.82	-1.28	-1.75	-1.73	-1.87	-1.28
AR(1) p-value	0.113	0.003	0.256	0.279	0.092	0.103	0.178	0.071	0.347	0.024	0.413	0.2	0.08	0.083	0.062	0.201
AR(2)	0.3	0.68	0.36	-0.27	-1.86	-1.85	-1.71	-1.65	0.92	1.17	-0.53	0.7	-1.21	-1.23	-0.74	-0.34
AR(2) p-value	0.765	0.498	0.718	0.788	0.063	0.064	0.088	0.1	0.356	0.242	0.596	0.482	0.227	0.218	0.459	0.733
Sargan Overidentification Test	34.16	31.54	44.38	25.45	43.17	37.6	69.77	59.13	29.13	13.45	43.88	26.44	29.31	18.51	21.63	45.47
Sargan p-value	0.047	0.341	0.007	0.113	0.072	0.051	0.138	0.232	0.023	0.857	0.008	0.09	0.553	0.82	0.894	0.291
Hansen Overidentification Test	28.07	36.35	19.23	22.31	34.42	33.88	58.92	54.05	14.83	10.09	19.11	11.93	29.8	25.59	30.06	43.79
Hansen p-value	0.173	0.164	0.74	0.219	0.307	0.11	0.442	0.396	0.537	0.966	0.746	0.851	0.528	0.43	0.514	0.354

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.33: Bank Liabilities to GDP & Investment to GDP: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.041	-0.0266	0.0389	0.062	0.0049	0.0437	-0.1059	-0.0119	-0.002	0.0895	0.6282*	0.0134	0.076	0.1294	0.2105	0.0465
	(0.079)	(0.052)	(0.106)	(0.063)	(0.087)	(0.084)	(0.082)	(0.048)	(0.119)	(0.131)	(0.346)	(0.133)	(0.144)	(0.185)	(0.192)	(0.146)
1st Lag of Investment to GDP Ratio	0.6615***	0.7595***	0.8163***	0.775***	0.7575***	0.5887***	0.6591***	0.57***								
	(0.182)	(0.083)	(0.152)	(0.137)	(0.104)	(0.14)	(0.129)	(0.129)								
1st Lag of Private Investment to GDP Ratio									0.569**	0.4303**	0.4482**	0.4303*	0.6178***	0.5255	0.4885**	0.1475
									(0.237)	(0.177)	(0.178)	(0.209)	(0.162)	(0.357)	(0.197)	(0.203)
Bank Liabilities to GDP Ratio	0.0351*		0.0447*		0.0112**		0.0004		0.0601		0.0137		-0.0056		-0.0332	
	(0.018)		(0.025)		(0.005)		(0.007)		(0.052)		(0.171)		(0.018)		(0.035)	
1st Lag of Bank Liabilities to GDP Ratio	-0.0659*	-0.0298**	-0.0973*		-0.0145**	-0.0069	-0.0057	-0.0044	-0.075		-0.0149	-0.0594	0.0137	-0.0134*	0.0197	
	(0.034)	(0.013)	(0.051)		(0.006)	(0.005)	(0.007)	(0.005)	(0.069)		(0.119)	(0.059)	(0.018)	(0.008)	(0.031)	
2nd Lag of Bank Liabilities to GDP Ratio	-0.0061		-0.0053	-0.0625	0.0034		0.0005		0.0291		0.5201		-0.0358		-0.0414	
	(0.045)		(0.082)	(0.04)	(0.004)		(0.005)		(0.095)		(0.439)		(0.026)		(0.034)	
3rd Lag of Bank Liabilities to GDP Ratio	-0.0216		-0.0029		0.0014		-0.0004		-0.059	-0.1582	-0.3462**		0.0046		0.006	-0.0056
	(0.049)		(0.047)		(0.003)		(0.003)		(0.09)	(0.106)	(0.123)		(0.011)		(0.009)	(0.006)
Bank Liabilities to GDP Ratio Squared	-0.0005*		-0.0006		-0.0001*		0		-0.0013		0.0014		0.0002		0.0005	
	(0)		(0)		(0)		(0)		(0.001)		(0.006)		(0)		(0)	
1st Lag of Bank Liabilities to GDP Ratio Squared	0.0016	0.0002	0.0022		0.0001**	0	0	0	0.0019		-0.0003	0.0012	-0.0002	0	-0.0003	
	(0.001)	(0)	(0.001)		(0)	(0)	(0)	(0)	(0.002)		(0.003)	(0.002)	(0)	(0)	(0)	
2nd Lag of Bank Liabilities to GDP Ratio Squared	0.0006		0.0017	0.0021	0		0		-0.0029		-0.0384		0.0006		0.0008	
	(0.002)		(0.005)	(0.002)	(0)		(0)		(0.006)		(0.032)		(0)		(0.001)	
3rd Lag of Bank Liabilities to GDP Ratio Squared	0.0018		0.0007		0		0		0.0034	0.0077	()		0		0	0.0001
	(0.003)		(0.002)		(0)		(0)		(0.005)	(0.005)			(0)		(0)	(0)
1st Lag of Gross Secondary School Enrolment Rate	0.007	-0.0235	0.0126	-0.0485	-0.0449	0.0255	0.1922*	0.0537	-0.0526	0.0069	-1.3975**	0.3324*	-0.1067	-0.0088	-0.0555	-0.017
	(0.14)	(0.062)	(0.163)	(0.108)	(0.122)	(0.106)	(0.115)	(0.072)	(0.129)	(0.254)	(0.568)	(0.176)	(0.193)	(0.115)	(0.19)	(0.177)
1st Lag of Inflation Rate			-0.0575	-0.09			-0.2065	-0.0595			0.4732	-0.0804			-0.6356	-0.189
			(0.306)	(0.116)			(0.178)	(0.107)			(0.285)	(0.109)			(0.697)	(0.498)
1st Lag of Government Consumption to GDP Ratio			-0.0847	0.0858			0.1012	0.1437			-0.4696	-0.4693			0.1166	0.0482
			(0.225)	(0.264)			(0.101)	(0.103)			(0.284)	(0.314)			(0.244)	(0.239)
1st Lag of FDI to GDP Ratio			-0.0604	-0.101**			0.0438	0.024			0.3046***	0.0823			0.0312	0.1105*
			(0.051)	(0.038)			(0.046)	(0.044)			(0.097)	(0.052)			(0.06)	(0.062)
1st Lag of Trade to GDP Ratio			-0.0783	0.3135			-0.1822	-0.0459			-0.5904	0.0349			-0.1442	-0.0146
			(0.26)	(0.367)			(0.114)	(0.156)			(0.734)	(0.46)			(0.252)	(0.223)
Constant	0.8813	0.9391**	1.0512	-1.0083	0.8607**	0.8308*	1.6459**	1.0094	1.3838	1.2005	4.3834	1.317	0.987*	0.4904	0.7127	2.0572***
	(0.754)	(0.417)	(1.551)	(2.208)	(0.419)	(0.476)	(0.7)	(0.647)	(1.321)	(0.998)	(3.977)	(2.184)	(0.576)	(0.523)	(1.501)	(0.726)
Observations	104	176	85	113	249	383	228	336	72	72	58	93	146	229	133	133
Groups	38	42	34	37	80	90	76	86	28	28	24	28	50	62	47	47
Instruments	37	40	43	32	46	40	71	71	31	28	43	33	46	40	43	52
AR(1)	-1.55	-3.11	-1.61	-2.1	-2.61	-2.47	-2.35	-2.33	-1.24	-1.08	-0.79	-1.11	-1.83	-1.31	-1.68	-0.94
AR(1) p-value	0.121	0.002	0.107	0.036	0.009	0.014	0.019	0.02	0.214	0.28	0.428	0.266	0.068	0.192	0.093	0.345
AR(2)	-0.07	1.33	0.02	-0.02	-1.55	-1.96	-1.55	-1.77	0.63	0.49	-0.74	-0.47	-0.79	-1.32	-0.18	-0.98
AR(2) p-value	0.945	0.185	0.986	0.986	0.122	0.05	0.12	0.076	0.532	0.621	0.46	0.639	0.427	0.188	0.859	0.328
Sargan Overidentification Test	30.67	29.31	31.05	18.75	41.32	35.3	74.25	75.21	23.51	20.95	38.44	32.96	18.97	19.96	16.21	36.08
Sargan p-value	0.103	0.449	0.152	0.408	0.102	0.195	0.023	0.044	0.101	0.34	0.031	0.017	0.955	0.894	0.881	0.604
Hansen Overidentification Test	25.13	27.49	17.19	9.52	30.9	34.41	49.52	65.44	9.76	16.33	3.61	12.03	31.49	26.06	23.29	31.37
Hansen p-value	0.291	0.545	0.841	0.947	0.471	0.225	0.572	0.182	0.879	0.635	1	0.846	0.442	0.622	0.503	0.803

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.34: Money Supply to GDP & Investment to GDP: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488
Country Group	Natural Resource-Based Countries					Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio					Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																	
1st Lag of Initial Real GDP per Capita	-0.026	-0.0006	-0.0951	0.007	0.0969	-0.0774*	0.0033	-0.1379**	-0.1326**	-0.0257	0.003	0.1001	0.1526	-0.0016	0.077	0.0124	0.0636
	(0.041)	(0.082)	(0.078)	(0.065)	(0.11)	(0.043)	(0.045)	(0.055)	(0.06)	(0.123)	(0.107)	(0.212)	(0.289)	(0.078)	(0.156)	(0.072)	(0.068)
1st Lag of Initial Real GNI per Capita																	
1st Lag of Investment to GDP Ratio	0.8119***	0.8322***	0.8629***	0.7464***	0.9102***	0.7923***	0.3547***	0.6777***	0.7363***								
	(0.068)	(0.105)	(0.121)	(0.241)	(0.222)	(0.091)	(0.112)	(0.101)	(0.09)								
1st Lag of Private Investment to GDP Ratio										0.8127***	0.8236***	0.703**	0.7468**	0.7455***	0.2741	0.5814***	0.4817**
										(0.182)	(0.114)	(0.317)	(0.319)	(0.136)	(0.279)	(0.127)	(0.205)
Money Supply to GDP Ratio	0.0286	0.027**	0.0173	0.0399		-0.0023	0.0077***	0.0069		0.0256		0.0256		-0.0033		0.0026	0.0084
	(0.019)	(0.01)	(0.011)	(0.034)		(0.01)	(0.003)	(0.008)		(0.032)		(0.042)		(0.014)		(0.014)	(0.010)
1st Lag of Money Supply to GDP Ratio	-0.0193	-0.0212**		-0.0535		-0.0006		-0.0003		-0.0162		-0.0265	-0.042	-0.0013		-0.0084	
	(0.019)	(0.009)		(0.048)		(0.012)		(0.01)		(0.036)		(0.06)	(0.047)	(0.014)		(0.017)	
2nd Lag of Money Supply to GDP Ratio	-0.0052			0.0042	-0.0322	0.0012		-0.0026		-0.0125	-0.0067	0.0145		0.0028	0.0045	0.0078	
	(0.017)			(0.023)	(0.04)	(0.005)		(0.008)		(0.033)	(0.007)	(0.025)		(0.006)	(0.005)	(0.009)	
3rd Lag of Money Supply to GDP Ratio	-0.0004			-0.0092		0.0061		0.008	0.0132*	0.0054		-0.002		0.0051		0.001	
	(0.009)			(0.018)		(0.005)		(0.005)	(0.007)	(0.018)		(0.022)		(0.006)		(0.007)	
Money Supply to GDP Ratio Squared	-0.0002	-0.0002**	-0.0002	-0.0003		0	0***	0		-0.0003		-0.0002		0		0.0001	-0.0001
	(0)	(0)	(0)	(0)		(0)	(0)	(0)		(0)		(0)		(0)		(0)	(0)
1st Lag of Money Supply to GDP Ratio Squared	0.0002	0.0002**		0.0005		0		0		0.0002		0.0003	0.0003	0		0	
	(0)	(0)		(0)		(0)		(0)		(0)		(0.001)	(0.001)	(0)		(0)	
2nd Lag of Money Supply to GDP Ratio Squared	0.0001			0	0.0004	0		0		0.0001	0.0001	-0.0002		0	0	0	
	(0)			(0)	(0.001)	(0)		(0)		(0)	(0)	(0)		(0)	(0)	(0)	
3rd Lag of Money Supply to GDP Ratio Squared	0			0		-0.0001		-0.0001	-0.0001*	0		0		-0.0001		0	
	(0)			(0)		(0)		(0)	(0)	(0)		(0)		(0)		(0)	
1st Lag of Gross Secondary School Enrolment Rate	0.0798	0.0163	0.1111	0.0684	-0.0776	0.1178	-0.0174	0.119	0.1529*	-0.0213	-0.0477	-0.0145	0.2581	-0.0078	-0.0602	0.1091	-0.1091
	(0.094)	(0.135)	(0.161)	(0.148)	(0.189)	(0.081)	(0.08)	(0.076)	(0.083)	(0.335)	(0.141)	(0.334)	(0.264)	(0.125)	(0.177)	(0.133)	(0.163)
1st Lag of Inflation Rate				-0.0245	-0.0621			-0.0289	-0.0132			-0.065	-0.1326			-0.2071	0.0301
				(0.121)	(0.08)			(0.306)	(0.164)			(0.213)	(0.128)			(0.277)	(0.177)
1st Lag of Government Consumption to GDP Ratio				-0.105	0.2625			0.2171*	0.1288			-0.152	-0.1959			0.1859	0.3155
				(0.284)	(0.446)			(0.116)	(0.116)			(0.454)	(0.589)			(0.149)	(0.211)
1st Lag of FDI to GDP Ratio				-0.0149	-0.0691			-0.009	-0.0102			-0.0478	0.0033			0.0225	0.0655
				(0.061)	(0.068)			(0.031)	(0.03)			(0.074)	(0.076)			(0.026)	(0.054)
1st Lag of Trade to GDP Ratio				-0.148	0.1611			-0.208*	-0.1762			0.1917	-0.194			-0.0873	0.0897
				(0.347)	(0.391)			(0.122)	(0.11)			(0.691)	(0.352)			(0.216)	(0.181)
Constant	0.4687	0.3031	0.5352	1.6391	-0.9591	0.7465**	1.7896***	1.5261**	1.3594***	0.6958	0.5145	-0.471	0.9035	0.4924	1.4483**	0.4706	-0.3321
	(0.455)	(0.459)	(0.807)	(1.571)	(2.158)	(0.371)	(0.429)	(0.641)	(0.465)	(1.736)	(0.824)	(3.237)	(2.581)	(0.501)	(0.693)	(0.794)	(0.701)
Observations	171	204	213	130	142	378	471	343	347	112	122	89	100	238	258	217	238
Groups	43	45	45	39	41	92	100	87	88	31	32	29	30	67	68	64	65
Instruments	43	41	42	45	33	55	51	85	73	33	31	45	30	54	44	63	60
AR(1)	-2.94	-2.71	-2.86	-2.39	-2.61	-2.8	-1.7	-2.75	-2.27	-2.32	-2.51	-0.82	-1	-2.56	-1.22	-2.28	-1.77
AR(1) p-value	0.003	0.007	0.004	0.017	0.009	0.005	0.089	0.006	0.023	0.02	0.012	0.415	0.316	0.01	0.224	0.023	0.077
AR(2)	0.69	0.73	0.85	0.52	-0.66	-2.02	-2.67	-2	-2.35	0.52	1	-0.61	-1.21	-1.25	-1.54	-0.1	-0.93
AR(2) p-value	0.488	0.463	0.395	0.603	0.51	0.044	0.007	0.046	0.019	0.605	0.32	0.54	0.227	0.211	0.123	0.918	0.353
Sargan Overidentification Test	24.83	22.59	28.24	32.63	15.19	44.25	40.65	65.05	54.48	11.29	21.76	33.71	25.48	28.28	23.98	29.98	39.26
Sargan p-value	0.529	0.707	0.558	0.112	0.649	0.192	0.313	0.44	0.607	0.791	0.353	0.09	0.044	0.848	0.874	0.918	0.713
Hansen Overidentification Test	27.5	30.79	32.51	18.1	10.79	37.94	45.83	65.83	58.86	21.05	13.92	6.95	12.56	34.62	31.89	39.17	43.42
Hansen p-value	0.383	0.28	0.344	0.798	0.903	0.426	0.151	0.413	0.444	0.177	0.834	1	0.636	0.581	0.522	0.596	0.539

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Table A.35: Broad Money Supply to GDP & Investment to GDP: Dynamic Panel GMM Models with Non-Monotonic Specification

Model Number	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504
Country Group	Natural Resource-Based Countries				Other Countries				Natural Resource-Based Countries				Other Countries			
Dependent Variable	Investment to GDP Ratio				Investment to GDP Ratio				Private Investment to GDP Ratio				Private Investment to GDP Ratio			
Independent Variables																
1st Lag of Initial Real GDP per Capita	0.3128	0.3731	0.4392	-0.0578	-0.0542	-0.007	-0.056	-0.1611	-1.7543	0.1273	-0.0705	-0.4487	-0.1205	-0.0385	-0.0389	-0.0813
	(0.514)	(0.44)	(0.249)	(0.459)	(0.043)	(0.054)	(0.047)	(0.119)	(1.118)	(0.109)	(0.661)	(0.61)	(0.164)	(0.226)	(0.097)	(0.135)
1st Lag of Investment to GDP Ratio	0.9491	0.0277	0.1361	0.9445	0.3378**	0.4505***	0.4353**	0.4834*								
	(0.592)	(0.552)	(0.829)	(0.644)	(0.155)	(0.106)	(0.209)	(0.271)								
1st Lag of Private Investment to GDP Ratio									()	0.7177**	()	()	0.4391	0.6259***	0.6018**	0.7801***
										(0.336)			(0.434)	(0.218)	(0.241)	(0.167)
Broad Money Supply to GDP Ratio	0.0016		-0.1741		0.0128		0.0235**		0.3119		0.2764	0.0512	0.0126		0.0064	
	(0.027)		(0.105)		(0.013)		(0.009)		(0.225)		(0.169)	(0.065)	(0.035)		(0.012)	
1st Lag of Broad Money Supply to GDP Ratio	-0.0226		0.0451	-0.0325	0.0006	0.0126*	-0.0237		0.1343		-0.1279		0.0012		-0.0045	-0.0135
	(0.044)		(0.045)	(0.04)	(0.017)	(0.007)	(0.014)		(0.156)		(0.176)		(0.028)		(0.016)	(0.01)
2nd Lag of Broad Money Supply to GDP Ratio		-0.0163														
		(0.08)														
3rd Lag of Broad Money Supply to GDP Ratio								0.0218		0.0173				0.0323**		
								(0.015)		(0.017)				(0.014)		
Broad Money Supply to GDP Ratio Squared	0.0001		0.0017		-0.0001		-0.0001*		-0.0032		-0.002	-0.0005	-0.0001		0	
	(0)		(0.001)		(0)		(0)		(0.002)		(0.001)	(0)	(0)		(0)	
1st Lag of Broad Money Supply to GDP Ratio Square	0.0002		-0.0001	0.0002	0	-0.0001	0.0001		-0.0006		0.0006		0		0	0.0001
	(0)		(0)	(0)	(0)	(0)	(0)		(0.001)		(0.002)		(0)		(0)	(0)
2nd Lag of Broad Money Supply to GDP Ratio Squar		0.0004														
		(0.001)														
3rd Lag of Broad Money Supply to GDP Ratio Square								-0.0001		-0.0002				-0.0002**		
								(0)		(0)				(0)		
1st Lag of Gross Secondary School Enrolment Rate	-0.6051	-0.4052**	-1.6481	0.0501	0.1269	0.0104	0.1317	0.1404	0.6208	0.1526	()	()	0.4209**	-0.0303	0.286*	0.219
	(0.831)	(0.171)	(1.035)	(0.329)	(0.114)	(0.095)	(0.126)	(0.165)	(0.834)	(0.135)			(0.214)	(0.175)	(0.16)	(0.206)
1st Lag of Inflation Rate			-1.4621	-0.0713			-0.3926	0.0332			-0.0545	0.2581			-0.5189	-0.2472
			(0.886)	(0.356)			(0.479)	(0.549)			(0.309)	(0.522)			(1.04)	(1.292)
1st Lag of Government Consumption to GDP Ratio			()	0.4277			0.0557	0.2467			()	1.9194			0.0257	0.2136
				(0.819)			(0.151)	(0.334)				(1.939)			(0.219)	(0.216)
1st Lag of FDI to GDP Ratio			-0.4037*	-0.0266			-0.0325	-0.0273			-0.1104	-0.0943			0.0062	0.0394
			(0.224)	(0.249)			(0.058)	(0.091)			(0.173)	(0.156)			(0.059)	(0.163)
1st Lag of Trade to GDP Ratio			1.2004	0.1166			-0.2445*	-0.3439			()	()			-0.2229	-0.3676
			(1.065)	(1.318)			(0.136)	(0.294)							(0.313)	(0.3)
Constant	-0.6774	1.0377	()	-0.7101	1.9644***	1.5477***	2.4408***	2.3277	()	-1.0042	()	()	0.5766	0.5804	1.2266	1.6689
	(3.796)	(1.696)		(4.5)	(0.512)	(0.51)	(0.86)	(1.607)		(1.197)			(0.676)	(1.353)	(1.169)	(1.02)
Observations	66	66	41	50	157	180	124	147	37	51	31	34	96	94	87	97
Groups	19	20	14	21	47	51	44	35	10	16	10	11	30	22	30	31
Instruments	26	21	37	33	43	49	37	33	26	21	31	33	26	26	37	33
AR(1)	-0.54	-0.81	-3.45	-1.03	-1.82	-2.21	-1.67	-0.52	-1.17	-1.3	-0.6	0.76	-0.62	-2.14	-1.62	-1.27
AR(1) p-value	0.592	0.418	0.001	0.302	0.069	0.027	0.096	0.6	0.241	0.193	0.546	0.445	0.536	0.032	0.105	0.205
AR(2)	0.91	-0.34	-0.17	0.28	-1.47	-1.64	-1.29	-0.72	-0.34	0.4	-0.76	-0.99	-1.02	-1.29	-0.58	-0.76
AR(2) p-value	0.363	0.737	0.865	0.777	0.141	0.101	0.196	0.468	0.73	0.688	0.445	0.322	0.307	0.199	0.559	0.446
Sargan Overidentification Test	18.67	13.36	33.74	25.65	32.34	51.02	31.38	52	31.92	16.14	40.31	30.45	15.82	5.77	24.91	20.77
Sargan p-value	0.097	0.204	0.028	0.108	0.22	0.039	0.05	0	0.001	0.096	0	0.033	0.2	0.983	0.205	0.291
Hansen Overidentification Test	3.74	5.43	0	6.71	28.93	25.96	18.76	19.36	0	4.86	0	0	7.97	4.57	6.76	13.6
Hansen p-value	0.988	0.861	1	0.992	0.364	0.866	0.537	0.37	1	0.9	1	1	0.787	0.995	0.997	0.754

Notes: the table reports the regression results of the Dynamic Panel System GMM models for the NRBC group and the other countries group. The models exclude from the country groups the members with banking sector depth ratios greater than 150% of GDP. The models use data from 1964 to 2013 that is averaged over ten non-overlapping five-year periods for all the variables except the initial real GDP per capita. The latter is the value for the first year of each period. In the linear models, the natural logarithms of the banking sector measures are used while in the non-linear models the actual values of the banking sector depth model are utilised. The controlling variables are included in all models in their natural logarithm form. The models control for variation in long-term economic growth over time by including time dummy variables that are not reported in the table. All the explanatory variables are treated as endogenous variables in the models while time dummy variables are treated as strictly exogenous. All the models are based on the two-step estimation procedure and the Windmeijer corrected standard error. Robust t- or z-statistics are shown in parentheses, with significance levels at the 10% (*), 5% (**), and 1% (***) levels indicated.

Appendix C – Project III

Table A.36: List of the Economic Growth Ratios & Proxies Employed as Dependent Variables in the Mixed Effects Models and as Independent Variables in the System GMM for Dynamic Panel Data Models:

Variable Name	Source	Code	Definition
GDP per capita (constant 2005 U.S. dollars)	World Development Indicators, World Bank	NY.GDP.PCAP.KD	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 U.S. dollars.
GNI per capita (constant 2005 U.S. dollars)	World Development Indicators, World Bank	NY.GNP.PCAP.KD	GNI per capita is gross national income divided by midyear population. GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in constant 2005 U.S. dollars.
Gross capital formation (% of GDP)	World Development Indicators, World Bank	NE.GDI.TOTL.ZS	Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 System of National Accounts, net acquisitions of valuables are also considered capital formation.
Gross fixed capital formation, private sector (% of GDP)	World Development Indicators, World Bank	NE.GDI.FPRV.ZS	Private investment covers gross outlays by the private sector (including private nonprofit agencies) on additions to its fixed domestic assets.

Note that the source of the variables definitions reported in the table is the World Development Indicators database.

Table A.37: List of the Banking Sector Depth Ratios Employed as Independent Variables in the Mixed Effects Models and as Dependent Variables in the System GMM for Dynamic Panel Data Models:

Variable Name	Source	Code	Definition
Domestic credit to private sector by banks (% of GDP)	World Development Indicators	FD.AST.PRVT.GD.ZS	Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.
Assets of Deposit Banks (U.S. dollars) to Total GDP in Current Prices (U.S. dollars)	Passport Database - Euromonitor International	Not Applicable	Assets of deposit banks are all claims of deposit money banks on other sectors of the economy and on non-residents. Deposit money banks comprise commercial banks and other banks that accept transferable deposits, such as demand deposits. Gross domestic product is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
Liabilities of Deposit Banks (U.S. dollars) to Total GDP in Current Prices (U.S. dollars)	Passport Database - Euromonitor International	Not Applicable	Liabilities of deposit banks include their liabilities to other sectors of the economy and their own capital accounts. Deposit money banks comprise commercial banks and other banks that accept transferable deposits, such as demand deposits. Gross domestic product is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
Money and quasi money (M2) as % of GDP	World Development Indicators, World Bank	FM.LBL.MQMY.GD.ZS	Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS).
Liquid liabilities (M3) as % of GDP	World Development Indicators, World Bank	FS.LBL.LIQU.GD.ZS	Liquid liabilities are also known as M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers cheques, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.

Note that the sources of the variables definitions reported in the table are the World Development Indicators and the Passport databases.

Table A.38: List of the Controlling Variables Employed in the Mixed Effects Models

Variable Name	Source	Code	Definition
Foreign direct investment, net inflows (% of GDP)	World Development Indicators, World Bank	BX.KLT.DINV.WD.GD.ZS	Foreign direct investment is the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.
General government final consumption expenditure (% of GDP)	World Development Indicators, World Bank	NE.CON.GOVT.ZS	General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.
Inflation, consumer prices (annual %)	World Development Indicators, World Bank	FP.CPI.TOTL.ZG	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.
School enrollment, secondary (% gross)	World Development Indicators, World Bank	SE.SEC.ENRR	Gross enrollment ratio. Secondary. All programmes. Total is the total enrollment in secondary education, regardless of age, expressed as a percentage of the population of official secondary education age. GER can exceed 100% due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition.
Trade (% of GDP)	World Development Indicators, World Bank	NE.TRD.GNFS.ZS	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.

Note that the source of the variables definitions reported in the table is the World Development Indicators database.

Table A.39: List of the Independent Variables Employed in the System GMM for Dynamic Panel Data Models: Banking Stability, Efficiency & Competition Measures

Variable Name	Source	Code	Definition
Bank Z-score	World Development Indicators, World Bank	GFDD.SI.01	It captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns.
Bank credit to bank deposits (%)	World Development Indicators, World Bank	GFDD.SI.04	The financial resources provided to the private sector by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks.
Bank net interest margin (%)	World Development Indicators, World Bank	GFDD.EI.01	Accounting value of bank's net interest revenue as a share of its average interest-bearing (total earning) assets.
Bank cost to income ratio (%)	World Development Indicators, World Bank	GFDD.EI.07	Operating expenses of a bank as a share of the sum of net-interest revenue and other operating income.
Bank concentration (%)	World Development Indicators, World Bank	GFDD.OI.01	Assets of three largest commercial banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets.
5-bank asset concentration	World Development Indicators, World Bank	GFDD.OI.06	Assets of five largest banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations and other assets.

Note that the source of the variables definitions reported in the table is the World Development Indicators database.

Table A.40: List of the Independent Variables Employed in the System GMM for Dynamic Panel Data Models: Macroeconomics & Demography Variables

Variable Name	Source	Code	Definition
Manufacturing, value added (% of GDP)	World Development Indicators, World Bank	NV.IND.MANF.ZS	Manufacturing refers to industries belonging to International Standard Industrial Classification (ISIC) divisions 15-37. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.
Industry, value added (% of GDP)	World Development Indicators, World Bank	NV.IND.TOTL.ZS	Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.
Services, etc., value added (% of GDP)	World Development Indicators, World Bank	NV.SRV.TETC.ZS	Services correspond to ISIC divisions 50-99 and they include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.
Gross savings (% of GDP)	World Development Indicators, World Bank	NY.GNS.ICTR.ZS	Gross savings are calculated as gross national income less total consumption, plus net transfers.
Household final consumption expenditure, etc. (% of GDP)	World Development Indicators, World Bank	NE.CON.PETC.ZS	Household final consumption expenditure (formerly private consumption) is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), purchased by households. It excludes purchases of dwellings but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses. Here, household consumption expenditure includes the expenditures of nonprofit institutions serving households, even when reported separately by the country. This item also includes any statistical discrepancy in the use of resources relative to the supply of resources.
Trade (% of GDP)	World Development Indicators, World Bank	NE.TRD.GNFS.ZS	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.
Consumer price index (2010 = 100)	World Development Indicators, World Bank	FP.CPI.TOTL	Consumer price index reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.
Population, total	World Development Indicators, World Bank	SE.SEC.ENRR	Total population is based on the *de facto* definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin. The values shown are midyear estimates.

Note that the source of the variables definitions reported in the table is the World Development Indicators database.

Table A.41: List of the Independent Variables Employed in the System GMM for Dynamic Panel Data Models: Governance, Institutional & Legal Indicators

Variable Name	Source	Code	Definition
Voice & Accountability	Worldwide Governance Indicators, World Bank	NA	Voice and accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Political Stability & Absence of Violence	Worldwide Governance Indicators, World Bank	NA	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.
Rule of Law	Worldwide Governance Indicators, World Bank	NA	Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Control of Corruption	Worldwide Governance Indicators, World Bank	NA	Control of corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the State by elites and private interests.
Government Effectiveness	Worldwide Governance Indicators, World Bank	NA	Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Regulatory Quality	Worldwide Governance Indicators, World Bank	NA	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Legal Origins: British	Global Development Network Growth Database, World Bank	NA	A dummy variable representing British legal origin.

Note that the source of the variables definitions reported in the table is the Worldwide Governance Indicators project.